THE IMPACT OF THE CURRENT PUBLIC SECTOR PROCUREMENT SYSTEM ON THE CONSULTING ENGINEERING INDUSTRY

by

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DECLARATION

I, Moegamat Fatgie Moos, declare that I know the meaning of plagiarism and that the content of this dissertation represents my own unaided work, save for that which is properly acknowledged, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily that of the University of Cape Town.

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Glossary

ACSA	Airports Company South Africa
BAC	Bid Adjudication Committee
BBBEE	Broad Based Black Economic Empowerment
CBE	Council for the Built Environment
CESA	Consulting Engineers South Africa (formerly SAACE)
CIDB	Construction Industry Development Board
CCT	City of Cape Town Metropolitan Municipality
ECSA	Engineering Council of South Africa
HDI	Historically Disadvantaged Individual
ICT	Information and Communications Technology
IMESA	Institution of Municipal Engineering of Southern Africa
LED	Local Economic Development
MFMA	Municipal Finance Management Act
MSA	Municipal Systems Act
NDP	National Development Plan
NDPW	National Department of Public Works
NERSA	National Energy Regulator of South Africa
NHBRC	National Home Builders Registration Council
NPC	National Planning Commission
NT	National Treasury
OCPO	Office of the Chief Procurement Officer
PDI	Previously Disadvantaged Individual
PFMA	Public Finance Management Act
PICC	Presidential Infrastructure Coordinating Council
PPPFA	Preferential Procurement Policy Framework Act
PRASA	Passenger Rail Agency of South Africa
PSP	Professional Service Provider
QBS	Quality Based Selection
QBS	Qualifications Based Selection (in relation to the Brooks Act)
QCBS	Quality and Cost Based Selection
RSA	Republic of South Africa
SAACE	South African Association of Consulting Engineers (now CESA)
SABTACO	South African Black Technical and Allied Careers Organisation
SAFCEC	South African Federation of Civil Engineering Contractors
SAICE	South African Institution of Civil Engineering
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SCM	Supply Chain Management
SIP	Strategic Infrastructure Projects
SIPDM	Standard for Infrastructure Procurement and Delivery Management
SKA	Square Kilometre Array
SMME	Small Medium and Micro Enterprises
UK	United Kingdom
USA	United States of America
WB	World Bank
WCG	Western Cape Government

Executive Summary

The development of infrastructure in our country is key to eliminating poverty and reducing inequality. This is confirmed by the establishment of the Presidential Infrastructure Coordinating Council who will coordinate the implementation of the 18 Strategic Infrastructure Projects as part of government's programme. For this infrastructure development programme to be successful, competent engineering professionals are needed.

The engineering industry is currently in crisis due mainly to the effect the current public sector procurement system has had on it. The procuring of consulting engineering services is currently done primarily by competitive tendering where price is the deciding factor in the award of tenders. Tenders are evaluated solely based on price and Broad Based Black Economic Empowerment requirements (also known as preference requirements). The criteria for expertise, experience and capacity are only used as qualifying criteria after which price and preference are used for the evaluation. This process is irrespective of the scale of the project or the skills required. Legislation governs the processes such as the Public Finance Management Act, Preferential Procurement Policy Framework Act, and the Municipal Finance Management Act. All public-sector institutions and public entities are therefore governed by this and must ensure compliance. There has however been an acknowledgement on the part of government that the current system needs to be reviewed. National Treasury published the Public Sector Supply Chain Management Review in February 2015. This frank look at the current Supply Chain Management system highlighted the shortfalls and what is required to be done to improve the system. The important acknowledgement out of this review is that construction procurement (which includes procurement of consulting services) is different to normal procurement for goods and services and different systems should apply. Following on from the review there are however indications that National Treasury would look to reintroduce elements of quality back into the evaluation and selection process for consulting services.

Despite the initiatives launched by government the current procurement system for consulting engineering services remains price driven. Respondents in the private and public sectors were surveyed for their views on the current state of procurement. From the research, respondents both in the private and public sectors indicate that competition based on price should be changed. Due to low fees tendered consultants no longer have the luxury of seconding senior experienced staff to projects for extended periods of time. Training, development and mentoring of graduate staff has also become less and firms have limited ability to reinvest for growth. Public sector clients' perceptions also indicate that consultants' quality of service has deteriorated.

To arrest the current situation, the study recommends that clarity be sought on the relevant sections of the constitution dealing with procurement. Once this is achieved the National Treasury and the National Department of Trade and Industry should be engaged to get the applicable legislation amended to accommodate a quality and cost based selection system and that considers the scale and complexity of projects. This will lead to consultants getting paid fees commensurate with the effort required to execute projects thereby allowing consultants to reinvest in their business that will ensure its longevity. This will contribute positively to the infrastructure development required to eliminate poverty, reduce inequality, and grow the economy.

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1. Introduction

1.1 Background

The Oxford dictionary defines procurement as the action of obtaining or procuring something (Concise Oxford English Dictionary, 2011). The items that are being procured should be appropriate to meet the needs of the purchaser and should be acquired at the best possible cost.

Procurement has evolved over the past century from being primarily a clerical function into something that companies consider to be part of their corporate strategy normally residing with the Chief Financial Officer within the organisation. Public sector institutions have very defined processes of procurement to promote fairness and transparency and to minimise fraud and corruption.

Procurement in the built environment or infrastructure procurement is the procurement of goods and services including any combination thereof associated with the acquisition, renovation, rehabilitation, alteration, maintenance, operation, or disposal of infrastructure (National Treasury, Model SCM Policy for Infrastructure Procurement and Delivery Management [Model SCM Policy], 2015). The procurement system must be governed by a set of rules, policies and guidelines which give effect to achieving the objectives set out. In the South African context, this starts with the Constitution of the Republic of South Africa (Act 108 of 1996). The following sections of the Constitution are relevant:

- Section 152: (1) The objects of local government are – (b) to ensure the provision of services in a sustainable manner; and (2) a municipality must strive, within its financial and administrative capacity, to achieve the objects set out in subsection (1)
- Section 195: (1) Public administration must be governed by the democratic values and principles enshrined in the Constitution, including the following principles: (b) the efficient, economic, and effective use of resources must be promoted
- Section 217: Procurement – (1) when an organ of state in the national, provincial, or local sphere of government, or any other institution identified in national legislation, contracts for goods and services, it must do so in accordance with a system which is fair, equitable, transparent, competitive and cost effective.

It is clear then from the Constitution that not only is procurement meant to be fair and transparent but the use of resources must be efficient, economic, and effective.

Procurement reform was started by the new South African government in 1995. This was to improve governance and introduce a preference system to address certain socio-economic objectives to redress injustices from the past. All organs of state, public institutions and state owned companies are meant to comply with the requirements of the legislation listed below.

To effectively deal with procurement reform and to give effect to the principles set out in the Constitution and to ensure that professional services are procured on a competitive basis, legislation has been enacted, regulations published and policy documents produced over the past 16 years. The following is an indication of what has been produced to date:

- Competition Act (RSA 1998)
- Public Finance Management Act (1999) and regulations (1999)
- Engineering Professions Act (2000)
- Municipal Systems Act (RSA 2000 & 2011)
- Preferential Procurement Policy Framework Act (RSA 2000) and subsequent regulations (RSA 2011)
- Local Government: Municipal Finance Management Act (RSA 2003) and subsequent regulations (RSA 2005)
- National Treasury Appointment of Consultants Practice Note Number Supply Chain Management 3 of 2003
- Preferential Procurement Policy for the Province of the Western Cape (2003)
- Construction Industry Development Board Procurement of Professional Services Best Practice Guideline #A7 (2007)
- Proposed Framework for the Construction Industry Development Board Register of Professional Service Providers (2007)
- City of Cape Town Supply Chain Management Policy (2011)
- Consulting Engineers South Africa Guideline: Procurement of Consulting Engineering Services (2011) and Supplementary Document (2013)

Over the past twelve years the consulting engineering industry has been trying to come to terms with the procurement of professional services on a competitive basis by the three spheres of government, public institutions, and state owned companies. Historically consultants would be appointed from a roster managed by clients with fees determined by gazetted fee scales published by government.

With the introduction of competitive bidding for professional services in 2004, the system of evaluation of bids comprised a functionality criteria component and a financial component. Points scored for each component would be weighted then added together giving the bidder a score. The highest scoring bidder would then be awarded the tender. This system changed in 2009 with a KwaZulu Natal High Court judgement (Case No. 10878/2009) when parts of the Preferential Procurement Regulations were declared inconsistent with the Preferential Procurement Policy Framework Act (Act No. 5 of 2000) and therefore invalid. This resulted in the removal of the functionality aspect from the evaluation process. Functionality could subsequently only be used as qualifying criteria. Evaluation was therefore only done based on price and BEE preference scoring. This system has resulted in consultants tendering very low fees for professional services. The gazetted fee scales are no longer used for the determination of professional fees and is only used as a guide.

The lower fee regime is perceived to have threatened the long-term sustainability of the industry and negatively impacted the quality of the work being produced. It is for this reason that the research is being undertaken and to better understand the impact the current procurement system has had on the consulting industry and whether the quality of work has been negatively impacted.

The research was undertaken as a perception study. As indicated by the aim it is to understand the impact on the industry. The data collection will therefore look at collecting impressions

and opinions from various people about the current state of the consulting industry and the impact the procurement system has had on it. The questionnaires have been designed with the above in mind.

1.2 Research Objectives

The main research question that will be considered is: *"What is the impact of the current public sector procurement system on the consulting engineering industry."*

The research objectives are to:

1. Consider the impact of the current public sector procurement system on the sustainability of the consulting engineering industry in terms of the survival of consultants, expansion of services, mentoring and training, attracting high quality staff and innovative technology;
2. Determine the impact of the current public sector procurement system on the quality of service provided by the consulting engineering industry in terms of quality of designs, appropriate use of staff in design and implementation stages of projects; and
3. Establish the dominance of price in the evaluation of bids and the effect this has had on the consulting engineering industry.

The research was undertaken within the framework of the current public sector procurement environment. The study has drawn on the current legislative and policy environment pertaining to our local context and on international best practice.

The research investigation has engaged with stakeholders in the industry. This included consulting engineers in private practice, clients mainly in the public sector and practitioners in the insurance industry who deal with Professional Indemnity (PI) claims.

The primary source of data collection has been through questionnaires and interviews with identified stakeholders. Two types of questionnaires have been designed, one for consulting engineers in private practice and the other for clients in the public sector. Participants have been identified through Consulting Engineers South Africa (CESA) for consultants in private practice and the Institution of Municipal Engineering of Southern Africa (IMESA) for public sector employees involved in procurement of professional services.

The thesis is divided into five main chapters. The first chapter deals with the introduction and setting the background to the research. The second chapter is a review of the literature both locally and internationally in support of the research question. Chapter three deals with the methodology for undertaking the research, while chapter four focuses on a discussion and presentation of the results. Chapter five draws conclusions from the data and chapter six deals with recommendations based on the results on how procurement can be changed to improve the situation of practitioners and for further research on this topic.

2. Literature Review

The focus of the literature review has been confined to public sector procurement policy, legislation and practice relating to consulting services in the South African context. This has been looked at historically in terms of how procurement has evolved since the advent of democracy in 1994. Linked to the evolution of procurement policy in the public sector is the capacity and skills available both in the public and private sectors. Skills availability is important in the context of significant infrastructure spend by government over the next 15 years. The literature review also looks at the status quo of engineering skills and plans by government to invest in infrastructure.

A review of international best practice has also been undertaken to understand how the procurement of consulting services is dealt with internationally and how this relates to the local context.

2.1 Key Concepts

Throughout the research report reference will be made to some key concepts relating to procurement. Some of these are described in a bit more detail below.

- *Competitive* – the effort of two or more parties acting independently to secure the business of a third party by offering the most favorable terms (In *Merriam Webster Online,* Retrieved May 03, 2017, from http://www.merriam-webster.com/dictionary).

- *Competitive bid* – a step in the process for procuring goods and services whereby a bidder submits a sealed bid to a client that has called for bids. After collecting and evaluating competitive bids from several bidders, the client awards the contract to the bidder with the best price and contract terms. Competitive bidding and competitive tendering will be used interchangeably throughout the report and is deemed to mean the same (Municipal Finance Management Act, Supply Chain Management Regulations, 2005).

- *Cost effective* – producing good results without costing a lot of money (In *Merriam Webster Online,* Retrieved May 03, 2017, from http://www.merriam-webster.com/dictionary).

- *Equitable* – dealing fairly and equally with all concerned (In *Merriam Webster Online,* Retrieved May 03, 2017, from http://www.merriam-webster.com/dictionary).

- *Fair* – marked by impartiality and honesty; free from self-interest, prejudice, or favoritism (In *Merriam Webster Online,* Retrieved May 03, 2017, from http://www.merriam-webster.com/dictionary).

- *Functionality criteria* – means the measurement according to some predetermined norms, as set out in the tender documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a tenderer (Preferential Procurement Regulations, 2011).

- *Historically Disadvantaged Individual (HDI)* – a South African citizen who held no franchise in national elections prior to the introduction of the 1983 Constitution and

1993 Interim Constitution, a female and or a person with a disability. Persons who obtained South African citizenship after the 1993 Interim Constitution are not deemed to be an HDI (RSA, Act 108, 1996).

- *Quality and Cost Based Selection (QCBS)* – a system of evaluation and selection of service providers based on skill and expertise making up the quality component and pricing which makes up the cost component. Cost is used carefully in the evaluation to avoid it becoming a dominant factor. The weightings given to quality and cost will depend on the nature and complexity of the assignment (Chinowsky & Kingsley, 2009).

- *Supply Chain Management (SCM)* – the design, planning, execution, control and monitoring of supply chain activities in the delivery of goods and services or works, with the objective of creating net value and providing oversight and coordination of information and finances within the supply chain (RSA, Public Sector Supply Chain Management Review, 2015).

- *Transparent* – characterised by visibility or accessibility of information in business practices (In *Merriam Webster Online*, Retrieved May 03, 2017, from http://www.merriam-webster.com/dictionary).

- *Value for money* – a fair return or equivalent in goods and services for the money spent (In *Merriam Webster Online*, Retrieved May 03, 2017, from http://www.merriam-webster.com/dictionary).

2.2 Infrastructure Development and Skills Requirements in South Africa

President Jacob Zuma in his State of the Nation Address of 14 February 2012 stated: *"The massive investment in infrastructure must leave more than just power stations, rail lines, dams and roads. It must industrialise the country, generate skills and boost much needed job creation."* (South African Government, State of the Nation Address, 2012).

2.2.1 National Planning

The need for national strategic planning was identified by government. The benefit of this is that it could create a single national vision of development for the country. The Minister in the Presidency for National Planning, Trevor Manuel, released the Green Paper on National Strategic Planning (2009). The Green Paper (2009:17) provides a platform for the launching of a long-term vision and a more coherent and coordinated planning approach across government.

One of the proposals from the Green Paper (2009:23) is the establishment of a National Planning Commission (NPC) made up of experts who are not part of government. The Commission was appointed in May 2010 by President Jacob Zuma. The mandate of the Commission was to take a broad, critical and independent, cross-cutting and long term view of the country to help define the South Africa we would like to achieve in 20 years' time and map out a path to achieve these objectives.

The NPC produced a Diagnostic Overview (South Africa, The Presidency, 2011). The Diagnostic Overview (2011:7) detailed the challenges in fighting poverty and inequality and identified nine main challenges that needed to be addressed.

They are:

1. Too few people work
2. The standard of education for most black learners is of poor quality
3. Infrastructure is poorly located, under-maintained and insufficient to foster higher growth
4. Spatial patterns exclude the poor from the fruits of development
5. The economy is overly and unsustainably resource intensive
6. A widespread disease burden is compounded by a failing public health system
7. Public services are uneven and often of poor quality
8. Corruption is widespread
9. South Africa remains a divided society.

The Diagnostic Overview (2011:8) identified the first two challenges, too few people work and the standard of education of black learners, as interrelated and the most crucial to be resolved and ensure the country's success. However, the Diagnostic Overview (2011:8-22) acknowledges the challenges identified in 3, 4 and 7 have a huge impact on the consulting engineering industry in particular and the built environment professions in general. In order to overcome these challenges a significant amount of human resources will be required.

In charting a way forward, the NPC (National Development Plan, Vision 2030, 2011) has proposed the following:

- Creating jobs and livelihoods
- Expanding infrastructure
- Transitioning to a low-carbon economy
- Transforming urban and rural spaces
- Improving education and training
- Providing quality health care
- Building a capable state
- Fighting corruption and enhancing accountability
- Transforming society and uniting the nation

From this the huge opportunities for consulting engineers that exist in our country can be seen. In order for the NPC to succeed in achieving its objectives the sustainability of the industry is of paramount importance.

The NPC is involved in advising government on an implementation framework for the National Development Plan (South Africa, The Presidency, 2012) (NDP). The NDP aims to eliminate poverty and reduce inequality by 2030.

2.2.2 Infrastructure Development

To coordinate, integrate and drive the efforts of infrastructure provision, skills development and job creation, the Presidential Infrastructure Coordinating Council (PICC) was established in September 2011. The PICC is made up of ministers, premiers and metro mayors and is led by the President and Deputy President. The government plans to invest some R845 billion over the next three years and R4 trillion over the next 15 years in major infrastructure projects. This long-term infrastructure build currently comprises 18 Strategic Infrastructure Projects (SIPs) and includes rail, ports, energy, health, education, transport, rural development, bulk services infrastructure, science and technology.

The Infrastructure Development Act (Act No. 23 of 2014) was promulgated to ensure the continued existence of the PICC and the implementation of the 18 SIPs.

Without the necessary skills to plan, construct, operate and maintain these SIPs, they will be an expensive exercise in outsourcing work that could otherwise have been used to grow our local skill and boost job creation.

2.2.3 Skills Requirements for Infrastructure Development

In the mid-2000s the South African Institution of Civil Engineering (SAICE) commissioned a study by Allyson Lawless to understand what is required to build civil engineering capacity in the industry in general and in local government in particular. This resulted in the publication of *Numbers & Needs in Local Government: Addressing civil engineering – the critical profession for service delivery* (Lawless, 2007).

2.2.3.1 Engineering Capacity Pre-1990

Lawless (2007:4-7) indicates that in the past engineering departments in municipalities was well structured, systematically managed and boasted experienced and well qualified staff. This could be seen in the 1980s where 2500-3000 civil engineers were employed in local government across the country. This equated to just over 21 civil engineering professionals per 100 000 population served – South Africa's population being around 14 million at this time. This was a result of strong engineering throughput South African universities in the 1970s. The number of civil engineering graduates nationally topped 300 for the first time in 1973 and reached an all-time high of 385 in 1977 (Lawless, 2007:6).

2.2.3.2 Deteriorating Engineering Capacity

In 2004/5 there were 83 municipalities with no civil engineering professionals and an average vacancy rate across the country of 40 – 60% indicated in *Numbers & Needs.* By 2005 the total number of engineering staff in local government dropped to 1534 – a drop of over 1000 professionals from the late 1980s. By this time South Africa's population had also significantly increased and included the former homelands and self-governing territories. This brought the ratio of professionals to population down from 20 to 3 per 100 000 population served in 2007. An average ratio in English speaking and Scandinavian countries is 22 professionals per 100 000 population served (Lawless, 2007:14).

The fast rate of urbanisation exacerbated this situation. Lawless (2007:11) indicates that 68% of South Africa's population will live in urban centres by 2025. This is due to better jobs, education, health and quality of life perceived to be offered in the larger urban centres in the country. This also gave rise to the rapid growth in informal settlements in the urban centres putting further strain on the ever-decreasing engineering staff in municipalities. The tables below give an indication of technical staff across municipalities in the country.

Table 1 Civil professionals employed in all levels of local government, April 2005 (Source: Lawless 2007:79)

	Municipalities	Engineers	Technologists	Technicians	Total
District municipalities	47	43	43	154	**240**
Local municipalities	231	98	100	377	**575**
Metros	6	240	226	253	**719**
Total	**284**	**381**	**369**	**784**	**1534**

The following observations from Table 1are relevant:

Table 2 Distribution of Civil professionals across local government

Municipalities	Engineers	Technologists	Technicians
District	0.9	0.9	3.2
Local	0.4	0.4	1.6
Metro	40	37	42

At the metropolitan level, there are 719 technical staff who serve approximately 16 million people across the 6 metros – 4.5 technical staff per 100 000 population served.

Table 3 Age distribution of civil professionals in local government, April 2005 (Source: Lawless 2007:79)

	District	Local	Metro	Total
Total staff below age 35	131	208	230	**569**
Staff aged 35 to 49	80	212	292	**584**
Staff aged 50+	29	155	197	**381**
Total	**240**	**575**	**719**	**1534**

The following observations from Table 3 are relevant:

- 25% of the total staff pool would have retired by 2020
- The pool of younger staff needs to be increased
- Municipal staff also has the option of taking early retirement at age 55

The result of this lack of capacity at local government level is that staff are overworked, there is general inefficiency and leads to physical and psychological stress which eventually results in institutional stress and comprised service delivery.

2.2.3.3 Capacitating Local Government

Lawless (2007:321-350) suggests that for service delivery to be improved and for the proposed infrastructure programme to succeed the capacity of local government needs to be increased. The study indicates that South Africa needs to aim for 5 – 8 technical staff per 100 000 population served. This means that the total capacity at local government level would need to increase to between 2700 – 3700 technical staff. This is an increase of approximately 1500 professionals. This staff increase would also have to ensure that the correct staff skills mix is achieved.

The study suggests that there should be at least 1 civil engineering professional for every 5000 households and in smaller municipalities there should be at least 1 professional to look after the technical services within the municipality (Lawless, 2007:334). For this to be achieved the skills shortage and the skills gap needs to be addressed.

The report recommends the following to achieve success:

- Increase training and capacity building
- Develop support initiatives in all professions in the build environment
- Increase the number of younger staff joining local government
- Curb losses and utilise the entire skills base
- Drive turnaround strategies
- Set conditions and criteria for support to local government (Lawless, 2007:349).

For municipalities to successfully deliver on their mandate support to them in the form of financial, logistical and human resources will be key to them achieving success.

2.3 The Evolution of Procurement

Prior to the advent of democracy in 1994 in South Africa all public sector procurement for goods and services was handled via the State Tender Boards. All organs of state could only procure goods and services under delegated authority from these tender boards. Furthermore there were provincial tender boards set up to deal with procurement in provincial government. This resulted in differing tender cultures due to conditions varying across national and provincial government.

There was therefore a need for reform and uniformity to eradicate any ambiguity in the procurement system. Reform of procurement policy started with the “10 point plan” of the National Department of Public Works in November 1995 (Policy Strategy to Guide Uniformity in Procurement Reform Processes in Government, 2003:11). The NDPW 10 point plan highlighted the following issues requiring attention:

- Access to tender information – easily accessible to all businesses
- Tender advice centres – to be established throughout the country
- Review tender procedures for contracts less than R7500.00
- Waiver of securities and sureties – contractors not required to provide these upfront
- Breakout procurement – unbundling of projects to their smallest possible size to give small businesses an opportunity to participate
- Early payment cycles – 30 day payment cycle to be enforced; payment to suppliers to be made with minimum delay
- Preferences and targeting – targeting of specific groups or persons disadvantaged by unfair discrimination
- Simplification of tender submission requirements
- Appointment of a procurement ombudsman
- Classification of building and civil engineering contracts.

The principles of fairness, equity and transparency are evident from the plan. Even though these issues that were identified related specifically to the construction industry, some of them could also be attributed to the consulting industry.

The first milestone was reached with the promulgation of the new South African Constitution in 1996 (Act No. 108 of 1996). Section 217 of the Constitution relates directly to the issue of procurement as mentioned previously in Chapter 1.

The Constitution set the imperative for a procurement system that is fair, equitable, transparent, competitive and cost effective. Any procurement system that was set up would have to subscribe to these principles. The first piece of legislation to introduce procurement into the public sector was the Public Finance Management Act (Act No. 1 of 1999, 1999:chap38) wherein Section 38(a)(iii) states that "*Accounting officers must ensure an appropriate procurement and provisioning system which is fair, equitable, transparent, competitive and cost effective*".

2.4 Procurement Objectives

The Constitution (Act No. 108 of 1996) set the broad objectives of fairness, equality, transparency, competition and cost. These principles now had to be translated into policy and legislation. The first policy framework document to be produced in this regard was a collaboration between the National Treasury and the National Department of Public Works. This resulted in the publication of the Green Paper on Public Sector Procurement Reform (1997). From the Green Paper, it became evident that the State would use procurement as an instrument to achieve specific socio-economic objectives. Some of the objectives highlighted in the Green Paper (1997:12) include:

- Promotion of the ease of access to the tendering system for small, medium and micro enterprises
- Promotion of good governance in terms of value for money and sound financial control
- Encourage greater competition in the public procurement process
- Promotion of efficient, economic and effective use of state resources

The Green Paper on Public Sector Procurement Reform set the framework for subsequent legislation introduced to achieve the principles set out in the Constitution. The Preferential Procurement Policy Framework Act (Act No. 5 of 2000) (PPPFA) set out to provide a framework for procurement to achieve the objectives set out in Section 217 of the Constitution. The PPPFA (Act No.5 of 2000, 2000:chap2) set out a preference points system to be followed for price and specific preference categories which is dealt with in further detail later.

2.5 Achieving Socio-Economic Redress

From the Green Paper (1997) it can be seen that it is the intention of the State to use procurement as a tool for socio-economic redress from the injustices under Apartheid. The introduction of the Broad Based Black Economic Empowerment Act (Act No. 53 of 2003) (BBBEE) was to establish a framework for the promotion of black economic empowerment.

The objectives of the BBBEE Act (Act No. 53 of 2003, 2003:chap2) are:

- To promote economic transformation to enable meaningful participation of black people in the economy
- To achieve substantial change in racial composition of ownership and management of enterprises
- To increase the extent to which communities participate in economic activity
- To increase the participation of black women
- To empower rural and local communities
- To promote access to finance for black economic empowerment

Section 9(1)(b) (Act No. 53 of 2003, 2003:chap9) also deals with the qualification criteria for preferential purposes for procurement. From the objectives of the BBBEE Act the aim is to bring people who have never participated in the formal economy before into the formal economy.

Prior to the introduction of the BBBEE Act, the Competition Act was legislated in 1998 (Act No. 89 of 1998). This was to evaluate restrictive practices and ensure no one enterprise had a dominant market position in a specific market sector. Essentially it was introduced to ensure increased market transparency. Furthermore, it ensured that the economy was open to greater ownership by a greater number of South Africans. One of the purposes of the Competition Act (Act No. 89 of 1998, 1998:chap2) relating to procurement was to provide consumers with competitive prices and product choices. Public sector procurement of goods and services was therefore seen by the State as an opportunity to broaden the participation of those previously excluded from providing goods and services to the State prior to 1994.

A piece of legislation directly related to the construction industry and to promote reform was the Construction Industry Development Board Act (Act No. 38 of 2000) (CIDB). The CIDB Act sought to establish the CIDB as an entity. The CIDB was to implement an integrated strategy for the reconstruction, growth and development of the construction industry. The objectives of the CIDB relating directly to procurement are:

- To promote policies aimed at procurement reform
- To standardise procurement documentation, processes, practices and procedures
- To promote best practice and value for money with regard to design (Act No. 38 of 2000, 2000:chap5)

The CIDB was also tasked with setting up a register of suppliers or professional service providers like the register for contractors (CIDB: Proposed Framework for the Register of Professional Service Providers, 2007). The CIDB may also advise the Minister of Public Works on policy and legislation impacting on the construction industry or propose amendments to the CIDB Act.

2.6 Supply Chain Management

Supply chain management represents efforts by suppliers to develop and implement supply chains that are efficient and economical that relates to their business processes. SCM has traditionally drawn from the areas of industrial engineering, systems engineering, operations management, logistics and procurement and seeks to integrate across elements of operational processes. SCM is defined as the design, planning, execution, control and monitoring of supply chain activities in the delivery of goods and services or works, with the objective of

creating net value and providing oversight and coordination of information and finances within the supply chain (National Treasury, Supply Chain Management: A Guide for Accounting Officers [SCM Guide], 2004).

To give effect to government policy of redress SCM was introduced as a mechanism to assist with this. The strategic importance of SCM has been recognised and the need to capacitate SCM units was identified to improve efficiency in the acquisition phase in public sector procurement.

The SCM Guide (2004:10) defines the elements of SCM as follows:

- Demand management – the start of supply chain where a needs assessment is done
- Acquisition management – the way the market will be approached, the compilation and evaluation of bids
- Logistics management – the basis for setting up the financial system to generate payments
- Disposal management – understanding the potential for re-use of material, determining a disposal strategy and setting the parameters for physical disposal
- Supply chain performance – monitoring and evaluation against norms and standards.

2.6.1 Setting up a Supply Chain Management System

The Public Finance Management Act (Act No. 1 of 1999, 1999:chap38) (PFMA) set the broad framework for a supply chain management system where it states, *"accounting officers must ensure an appropriate procurement and provisioning system…"*. This legal prescript made it compulsory for all public sector institutions involved in the procurement of goods and services to set up a system of procurement which was in line with the principles set out in the Constitution.

To ensure uniformity in procurement the National Treasury published the Public Finance Management Act Regulations (2005) detailing what a procurement and provisioning system should look like. The regulations were reviewed and updated and a draft set of regulations was published in 2012 for comment. Section 20 of the draft regulations deals with matters of SCM generally and sets out the principals of an appropriate SCM system. These principles include fairness, equity, transparency, competitiveness and cost effectiveness. The draft regulations also deal with competitive bidding, emergency procurement, contracts procured by other organs of state and the appointment of consultants. Section 30 of the draft regulations deals specifically with SCM for the delivery and maintenance of infrastructure. The State recognised the need to intervene in the slow delivery of infrastructure and hence the inclusion of Section 30 in the draft regulations.

While the PFMA (Act No. 1 of 1999) looked at the financial and legal aspects of setting up a SCM system, the PPPFA regulations published in 2011 looked at setting up a preference point system as set out in the PPPFA for the evaluation of tenders.

2.6.2 Implementing a Supply Chain Management System

Local government is seen as being at the coal face of the delivery of services to communities. Local government therefore had to be capacitated to deliver on this mandate. This was achieved by the introduction of legislation relating to procurement within local government described hereunder.

The Municipal Systems Act (Act No. 32 of 2000) (MSA) defined the legal nature, functions, and powers of municipalities. The promulgation of the act was to give effect to the new system of local government post the 1994 elections. The MSA (Act No.32 of 2000, 2000:chap78, 83) also sets out the requirements for the procurement of goods and services and these are dealt with specifically in Section 78(5)(a) and Section 83. Section 78 deals with the appointment of external service providers and Section 83 deals with appointment of external service providers on a competitive bidding basis. The municipality should ensure that the selection process is fair, equitable, transparent, competitive and cost effective. It should also ensure that all service providers have equal access to all the information; it should minimise the possibility of fraud and corruption; are accountable to the local community and it should ensure the empowerment of small and emerging enterprises. The MSA therefore sets the framework for procurement of goods and services at the local government level.

To ensure sound financial management at the local government level the National Treasury enacted the Municipal Finance Management Act (Act No. 56 of 2003) (MFMA). As is the case with the PFMA (Act No. 1 of 1999) which regulates financial matters at national and provincial government level, the MFMA is meant to secure sound and sustainable management of the financial affairs of municipalities. The MFMA details the requirements for the procurement of goods and services and mentions that all municipalities should have a supply chain management policy. It further indicates that this process does not apply when a municipality is contracting with another organ of state and can produce goods and services under a contract procured via that organ of state, provided that the service provider has agreed to such procurement. The MFMA also deals with procurement of goods and services via unsolicited bids and public private partnerships but sets stringent requirements for both these processes.

The Municipal Finance Management Act: Supply Chain Management Regulations were published in May 2005 in support of the MFMA (Act No. 56 of 2003). The Supply Chain Management Regulations (2005) spell out in detail what is required of municipalities in terms of supply chain management. The SCM policy of a municipality should be in accordance with Section 111 of the MFMA (Act No 56 of 2003, 2003:chap111); all goods and services should be procured in terms of a municipality's SCM policy and all municipalities should establish a SCM unit. For all procurement of goods and services above a value of R200 000.00 a competitive bidding process should be followed and the bid documentation should clearly indicate the evaluation and adjudication criteria. The Supply Chain Management Regulations (2005:20) allow for a two stage bidding process that includes a technical and financial offer and it further allows for the procurement of goods and services under contracts secured by other organs of state provided that these contracts have been validly procured on a competitive basis and the service provider has consented to this arrangement. Section 35 of the Supply Chain Management Regulations (2005:25) deals with the appointment of consultants. Following on from the review of SCM by the National Treasury in 2015, supplementary regulations were published to deal with the procurement of infrastructure specifically. This is dealt with further on in Section 2.8.3 of this literature review.

From the above and previous section it is clear what the requirements for the procurement of goods and services in the public sector are, as outlined by the PFMA (Act No 1 of 1999), PPPFA (Act No. 5 of 2000) and the MFMA (Act No. 56 of 2003). This is further detailed by the supporting regulations published in terms of these Acts. The common thread throughout the legislation is that the process engaged must be fair, equitable, transparent, competitive and cost effective thus underpinning the principles set out in the Constitution.

2.7 Challenges in the South African Public Sector Procurement Environment

2.7.1 Context

Public sector procurement in South Africa has been well regulated. The legislation all subscribe to the principles set out in Section 217 of the Constitution (Act No. 108 of 1996) and is well intentioned. The policy, regulations, and legislation all ensure fairness, equity, transparency, competitiveness and cost effectiveness and the minimisation of corrupt and abusive practices.

2.7.2 Current Challenges in Procurement

As well intentioned as the legislation and policy may be it has not come with the necessary financial and human resource capacity to assist with the implementation. Ambe and Badenhorst-Weiss (2012:242-257) highlight some of the challenges facing the public-sector procurement environment include:

- A lack of proper knowledge, skill and capacity
- Inadequate planning and linking of demand to budget availability
- Non-compliance with SCM policy and regulations
- Lack of accountability leading to fraud, corruption and unethical behaviour
- Inadequate monitoring and evaluation of SCM
- Ineffectiveness of the BBBEE policy

Due to skill and capacity constraints public sector bodies cannot deal with the evaluation of bids timeously. Discussion with officials at the City of Cape Town's SCM unit indicates that it can take from 2 weeks to 24 weeks to conclude a tender evaluation process and submit a report to the bid adjudication committee (BAC) for approval. A standard tender process is as follows:

- 4 weeks from advertising to closing
- Average of 11 weeks to accept the tender by the BAC
- 3 weeks to lodge appeals
- Average of 4 weeks to conclude the appeals process depending on the complexity of the appeals

From the process above it is evident that it could take on average 22 weeks from the time a tender is advertised until the service provider is appointed. Depending on the process and whether there are any appeals, the nature and validity of the appeals, the appointment of a service provider could take anywhere from 3 to 6 months. If appeals are valid and they are upheld, projects run the risk of being delayed further or even terminated depending on the nature and outcome of the appeal.

2.7.3 The Impact of the KwaZulu Natal High Court Judgement

Another challenge is the misalignment of the legislation and regulations. This was highlighted in the KwaZulu Natal High Court judgement in Sizabonke Civils t/a Pilcon Projects v Zululand District Municipality & Others (Case No. 10878/2009) which dealt with the conflict that existed between the PPPFA and the Preferential Procurement Regulations of 2001. The judge in the case effectively ruled that the regulations dealing with the functionality criteria were inconsistent with the PPPFA (Act No. 5 of 2000) and were therefore invalid. This had significant implications for SCM across all public-sector institutions. All future bids would therefore no longer have functionality criteria as part of the evaluation criteria and could therefore not score any points. All bids from here on were therefore evaluated on price and preference only. This outcome had a direct and significant impact on the consulting engineering environment where price rather than skill was now the major deciding factor in awarding bids. This situation was however reversed slightly with the publication of the revised National Treasury Preferential Procurement Regulations in June 2011. Section 4 of the revised Preferential Procurement Regulations (2011:5) allowed for the reintroduction of functionality into the bid process albeit as qualifying criteria. Functionality would therefore still not score any points and could not be used in the final evaluation of bids.

2.7.4 A Case Study of Price Driven Competition

Another significant challenge of the current public sector procurement system is the practice of low fee tendering by consulting engineers and built environment professionals. The Engineering Council of South Africa (ECSA) publishes annual recommended fee tariffs for consulting engineering services. The practice of low fee tendering became prevalent soon after the functionality aspects were taken out of the evaluation process as per the above court case. A short study was undertaken by a CESA member firm after the 2011 City of Cape Town / CESA Liaison Committee meeting. This was to illustrate what was currently happening in the industry. Four similar tenders from the CCT were considered for review as depicted in Table 4.

Table 4 Analysis of Selected City of Cape Town Tenders (Source: CESA Member Firm, 2011)

Date of Submission	Project Title	Construction Value (estimated)	CESA Member Design Fee	Tendered Value of Design Fee	ECSA Design Fee (2012)	ECSA Design Fee %	Fee Variance	Overall Ranking
2012-09-17	Project 1	R 10.5m	189,000.00	1.80%	R 1,040,000.00	9.90%	18%	14
2012-09-17	Project 2	R 18m	358,200.00	1.99%	R 1,663,500.00	9.20%	22%	3
2012-09-29	Project 3	R 13m	260,000.00	2.00%	R 1,263,500.00	9.70%	21%	3
2012-09-30	Project 4	R 25m	500,000.00	2.00%	R 2,223,500.00	8.90%	22%	8

From the above table, the price variance for consulting services tendered is significant. The average tendered price by the CESA member firm is approximately 20% of the recommended ECSA fee tariff for design fees. Even though the sample is small it is a fair reflection of what is currently happening in public sector government.

2.8 Current Initiatives in South Africa to Improve Public Sector Procurement

2.8.1 Consulting Engineers South Africa Initiatives

CESA on behalf of its members has been the most vocal of the professional associations on the issue of procurement of consulting services. It is in constant engagement with national government departments through its liaison committees to try to improve the system of procuring consulting services in the public sector.

CESA published a discussion paper titled *Best Practice: Procurement of Consulting Engineering Services in South Africa* (2014). In it CESA is quite critical of the current system of procurement. It highlights that the system is problematic, ineffective and fails to meet the needs of the country and its citizens through delays, non-delivery and corruption (Best Practice: Procurement of Consulting Engineering Services in South Africa [Procurement of Consulting Services], 2014:1). Subsequently this has a negative result on service delivery and job creation and perpetuates inequality and poverty.

CESA acknowledges that the legislation is well drafted but has unintended consequences that government needs to address. Issues it identifies as requiring attention are as follows:

- Treating infrastructure as an off-the-shelf commodity
- Placing emphasis on price at the expense of quality / functionality
- Encouraging discounting through open competitive tendering leading to financial losses and weak developmental outcomes (you get what you pay for)
- Time restriction on professional service provider appointments – currently limited to three years but some projects exceed this
- Government lacking the technical capacity to plan and manage large infrastructure projects
- Lack of enforcement by government leading to procurement irregularities
- Delayed infrastructure investment by government hampers proper planning and allocation of resources
- Poor schooling in maths and science contributes to the lack of capacity and throughput of engineers (Procurement of Consulting Services, 2014:1).

CESA in its discussion paper proposes that government adopts the following measures to unlock public sector infrastructure procurement and effective delivery of the NDP:

- The reintroduction of quality / functionality by the Department of Trade and Industry into the PPPFA of 2000 (Act No 5 of 2000)
- The National Treasury to re-issue and make its PFMA SCM Practice Note 3 of 2003 mandatory
- Public sector clients who lack technical capacity to manage and implement infrastructure projects to make use of consulting engineering firms' services to assist and build capacity
- The encouragement of public sector clients to establish framework agreements on a competitive scoring basis with quality and BBBEE as a focus
- The encouragement of joint ventures with smaller firms as a mechanism for empowerment and capacity building in the industry

- Infrastructure tenders should be awarded on the scope of a project rather than the appointment limited to three years as required by the MFMA, irrespective of the time required to complete the project (Procurement of Consulting Services, 2014:2).

2.8.2 National Treasury Review of Supply Chain Management

In acknowledging the frustration within public sector procurement, the National Treasury published the *Public Sector Supply Chain Management Review* in February 2015 (South Africa, National Treasury, Public Sector Supply Chain Management Review [Public Sector SCM Review], 2015) after an in-depth review of the current system. This was a frank review of the status quo highlighting the issues and how best they should be addressed.
The Public Sector SCM Review (2015:4-5) identifies the following issues to be hampering the effective performance of SCM:

- Lack of understanding of the strategic importance of SCM
- Organisational structure and systems for SCM not ideal due to under-skilled leadership, high staff turnover and lack of motivation
- Lack of understanding of roles and responsibilities of technical staff and political office bearers
- General lack of skills, knowledge and experience amongst SCM staff
- Lack of accountability due to non-performance
- SCM requirements and processes are cumbersome
- Suppliers taking advantage of the weak SCM environment
- Finding the balance between cost effectiveness and using SCM as a means of development and transformation

Various reforms are underway to improve the system. These include:

- Rationalising the legal environment – currently there are more than 80 legal instruments, guidelines and instruction notes that govern public sector SCM; the intention is for this to be rationalised into a single piece of legislation
- Changes to tender documents – documents to be made more user friendly; documents will be standardised
- Streamlining business processes – removing unnecessary steps in SCM; centralised database to be put in place to manage mandatory administrative documents; reducing the cost of doing business for suppliers
- Creating a culture of cooperation – encourage structured interaction with suppliers and regular dissemination of information
- Greater transparency in the SCM process – development of a standardised reporting system across the public sector; publication of tender information and awards; implementation of a system to detect whether officials are doing business with the state
- Office of the Chief Procurement Officer (OCPO) Website – this will be used to house all SCM information for suppliers and public sector institutions (Public Sector SCM Review, 2015:12-13).

The review acknowledges that procurement processes for general goods and services is different to that of infrastructure. To this end it looks specifically at SCM for infrastructure

delivery and maintenance. The Public Sector SCM Review (2015:29) highlights issues affecting public sector infrastructure SCM as follows:

- Institutional arrangements; roles and responsibilities are not clearly defined and is a cause of conflicting views between client departments and implementing agents
- Organisational capacity: a lack of infrastructure management capacity exists within public sector institutions resulting in delivery delays, cost overruns and poor quality service
- Systems and processes: as previously mentioned the current SCM system, processes and requirements are cumbersome and adds to the cost of doing business
- Regulatory and governance controls: needs to ensure that the outputs and outcomes of procurement are of the right quality and within acceptable levels of risk exposure.

To improve the performance of infrastructure procurement, reforms are proposed to be implemented by government. This will improve quality and faster service at the best price. The reforms relating to the construction industry proposed by the Public Sector SCM Review (2015:31) are:

- Regulatory reforms: a standard approach to infrastructure delivery; flexibility to look at alternative and innovative delivery models; strengthen public sector institutions like the CIDB and OCPO; introduce a grading system for engineering services like the one in operation for contractors; support measures to promote contractor development and participation of emerging firms
- Systems and processes: reviewing and standardising planning processes and documentation to reduce project lead time, speed up delivery and minimise the opportunity for tender manipulation; build internal capacity to better manage built environment professionals; institute a reporting framework to ensure transparency; exploring the implementation of framework contracts to speed up delivery
- Organisational capacity: strengthening governments SCM capability by improving capacity, skills and reducing staff turnover.

Due to their varying and contributing roles in infrastructure provision, the following organisations are key stakeholders in the successful implementation of the supply management reforms:

- Council for the Built Environment (CBE) – In consultation with the Competition Commission and with the councils for the various professions, in terms of the Council for the Built Environment Act (Act 43 of 2000) the CBE is responsible for identifying the scope of work of the various categories of built-environment professionals
- Construction Industry Development Board (CIDB) - The CIDB Act (Act 38 of 2000) mandates the organisation to perform a number of functions including establishing a national register of contractors and of construction projects; providing strategic direction; developing effective partnerships for growth, reform and improvement in the construction sector; and promoting delivery management capacity and uniform application of procurement policy, improved performance and best practice in the public and private sectors, and sustainable participation by emerging contractors.
- Engineering Council of South Africa (ECSA) – Established in terms of the Engineering Professions Act 46 of 2000, ECSA is the statutory body which regulates the engineering profession
- National Home Builders Registration Council (NHBRC) – is the body that regulates the home building industry; working with the Department of Human Settlements, the

NHBRC provides advisory services on industry developments, securing land for housing development, design and construction of homes, environment services and engineering services

- National Energy Regulator of South Africa (NERSA) - Established in terms of Section 3 of the National Energy Regulator Act, 2004 (Act No. 40 of 2004), NERSA is the authority which regulates the electricity, piped-gas and petroleum pipeline industries. Its work therefore has a bearing on public infrastructure.
- Municipalities - play an important quality assurance role in infrastructure; they set building norms and standards; approve building plans; and assess the various steps in the construction process.

Due to the sheer buying power of government strategic sourcing and transversal contracting have been identified as mechanisms to improve the current public sector procurement system. Strategic sourcing looks at the strategic importance of goods, identifying suppliers and managing relationships with them and through this obtain best value for money (Public Sector SCM Review, 2015:36). Transversal contracting looks at centrally negotiating contracts for goods and services in a manner that promotes regional and local economies (Public Sector SCM Review, 2015:46). In both cases collaboration and building long term relationships is vital to its success.

In order for government to achieve its objectives, it is critical that its SCM function is well performing. In order to achieve this it needs to ensure that it is staffed with competent, objective and impartial people. The lack of capacity in SCM has previously been highlighted as one of the areas requiring attention to improve SCM performance. The Public Sector SCM Review (2015:57) indicates initiatives already underway:

- SCM master curriculum
- Individual skills assessment toolkit
- SCM certificate learnership
- Development and delivery of training programmes

The Public Sector SCM Review is a candid reflection of the current state of SCM in the public sector. It is encouraging to note the acknowledgement by government of the issues that need to be addressed and reforms proposed and some already underway to address these issues and improve the performance of SCM across the board.

2.8.3 Preferential Procurement Regulations Review

The National Treasury published the draft *Preferential Procurement Policy Framework Act, 2000: Preferential Procurement Regulations, 2015* (South Africa, National Treasury, 2015). These regulations are meant to supercede the regulations published in 2011. The new regulations allow for the evaluation of bids on functionality but again this is prescribed only as a qualifying measure and is not used in the final evaluation of the tender. An additional category of preference points is introduced for the evaluation of bids. In addition to the 80/20 and 90/10 a category of 50/50 has been introduced. This category is in respect of bids with a value less than R10 million. 50 points is allocated for price and 50 points allocated for preference with specific goals of HDI's, ownership by females, ownership by persons with disabilities, SMME's and LED (Preferential Procurement Policy Framework Act, 2000: Preferential Procurement Regulations [Preferential Procurement Regulations], 2015:1). The Preferential Procurement Regulations (2015:10) also compel organs of state to conduct price

analysis to determine whether bid prices received are fair and reasonable. This analysis should include comparing:

- Same or similar goods or services at similar units of measure
- Prices received for a particular bid with one another for the same bid
- Proposed prices with prices under existing contracts with allowance for market changes
- Proposed prices with average market prices and prices offered to other institutions
- Proposed prices with prices set by law or regulation

The price analysis should be documented in writing and forms part of the bid evaluation report. The fact that a pricing analysis requirement has been included in the draft regulations indicates to some extent the impact of the current pricing on bids in the public sector. At the time of writing it was not clear when government would publish the final regulations.

2.8.4 Model Supply Chain Management Policy for Municipalities

National Treasury published *MFMA Circular No 77: Model SCM Policy for Infrastructure Procurement and Delivery Management* (South Africa, National Treasury, 2015). The purpose of this circular is to provide guidance to municipalities and municipal entities to establish a suitable SCM for infrastructure delivery. The circular is published with two annexures viz.

- Annexure A – Model SCM Policy for Infrastructure Procurement and Delivery Management (National Treasury, Model SCM Policy for Infrastructure Procurement and Delivery Management [Model SCM Policy], 2015).
- Annexure B – National Treasury Standard for Infrastructure Procurement and Delivery Management (National Treasury, Standard for Infrastructure Procurement and Delivery Management [SIPDM], 2015).

The document provides guidelines to municipalities to amend their existing SCM policies to align with the new requirements. It also set out the standard to be followed for the roll out of infrastructure projects. The document highlights the need to separate SCM requirements for general goods and services from those for infrastructure delivery to improve project outcomes. The Model SCM Policy and the Standard for Infrastructure Procurement and Delivery Management is discussed further below.

2.8.4.1 Model Supply Chain Management Policy for Infrastructure Procurement and Delivery Management

The Model SCM Policy (2015:1) sets minimum requirements for the following as applied to infrastructure procurement and delivery management:

- Institutional arrangements
- Demand management acquisition management
- Contract management
- Logistics management
- Disposal management
- Reporting of SCM information
- Regular assessment of SCM performance and
- Risk management and internal control.

It also prescribes a control framework for the planning, design and implementation of infrastructure projects and infrastructure procurement (Model SCM Policy, 2015:4). These control frameworks are aimed at expenditure control and a reduction in the gap between what is planned and what is ultimately delivered to ensure that value for money is achieved. An important acknowledgement in the document is the differentiation between normal procurement and that for the procurement of infrastructure. The document sets out a proforma SCM policy for infrastructure procurement and delivery management that can be adopted by various organs of state.

2.8.4.2 National Treasury Standard for Infrastructure Procurement and Delivery Management (SIPDM)

The SIPDM (2015:9) prescribes the following control framework for infrastructure delivery management:

- Project initiation – a report giving a high-level business case together with estimated project costs and timelines for a project or group of projects
- Infrastructure planning – an infrastructure plan that identifies & prioritises projects against a forecasted budget of at least five years
- Strategic resourcing – a procurement and delivery strategy for a project or group of projects
- Prefeasibility – a report that determines whether to proceed with a project
- Preparation and briefing – a strategic brief that defines project objectives, client requirements and sets out the basis for the development of the concept
- Feasibility – a report that presents sufficient information to determine whether the project should be implemented
- Concept and viability – a report that establishes the detailed brief, scope, and budget
- Design development – a report that develops in detail the approved concept to finalise the design, cost and timelines
- Design documentation – production information that details the systems and components enabling construction or manufacture
- Works – completed works which can be occupied or used
- Handover – works that have been taken over by the user or owner complete with record information
- Package completion – works with notified defects corrected, final account settled and close out report issued.

Implementation plans relating to new infrastructure or the rehabilitation of existing infrastructure needs to be developed for each project and financial data needs to be gathered to enable financial reports to be generated at regular intervals.

The SIPDM (2015:4) defines value for money as *"the optimal use of resources to achieve intended outcomes"*. Public infrastructure that is acquired needs to be financially, economically, and technically viable and should offer value for money over its lifecycle. This speaks to the Constitutional principles of economic, efficient, and effective.

To improve project outcomes the SIPDM (2015:4) has been designed around the following principles:

- Adopt a strategic approach to procurement and delivery management above the project level
- Establish trust-based engagement of stakeholders throughout the process
- Establish governance systems including oversight roles to ensure value for money throughout the project cycle
- Put in place rigorous project selection processes
- Differentiate between the different types of procurement methods and their challenges and skills sets required
- Standardise delivery to mitigate risk
- Build trust relationships with the private sector
- Establish reliable data gathering systems to promote oversight and long term planning
- Develop strong public sector capability across the value chain of planning, delivery and operations
- Increase the transparency and access to information.

With respect to the procurement of consulting services the SIPDM (2015:36) makes provision for framework agreements. They are defined as "an agreement between an organ of state and one or more contractors, the purpose of which is to establish the terms governing orders to be awarded during a given period, particular with regard to price, and where appropriate, the quantity envisaged" (SIPDM, 2015:2). Framework agreements reduce the client's need to re-advertise and approach the market for goods, services and works that fall within the scope of the agreement. Framework agreements are only entered with contractors or service providers who have the resources and capability to carry out the work that is likely to be instructed and for a term not exceeding three years for all organs of state. The framework contracts need to contain terms that establish:

- The rights and obligations of the contracting parties and the agreed procedures for the administration of the contract and the issuing of orders
- The term of the agreement during which an order may be issued
- The scope of the work that may be included in an order
- The basis of remuneration
- The way competition amongst contractors or service providers is to be conducted (SIPDM, 2015:36).

A framework agreement may be entered into with contractors or service providers for a term by inviting tender offers using stringent eligibility and evaluation criteria to ensure only those who have the necessary capability and capacity are contacted with. The normal procurement processes are followed with the only difference being that there is no price attached to the framework agreement. The procurement requirements therefore need to be carefully considered to ensure that tenders can be compared on a comparative basis.

The SIPDM (2015:34) also touches on the issue of the functionality and quality in the evaluation of tenders. As indicated previously by the KZN High Court judgement the use of functionality was removed as part of the evaluation criteria for tenders. The SIPDM however permits quality to be evaluated in tender submissions as other objective criteria as provided for in the PPPFA. It recommends that an evaluation that includes quality criteria be evaluated

by at least three persons who are professionally registered in certain categories with a built environment council falling under the umbrella of the CBE.

From the above government, has acknowledged that the procurement of infrastructure requires attention and has set a process in motion to bring about reform.

2.9 International Approaches to Public Sector Procurement of Consulting Services

The literature available on procurement internationally is extensive. The research focusses on the consulting engineering environment and it was therefore decided to limit the review to the institutions internationally that are involved in the development of significant infrastructure either through loan or grant funding and or have a well-developed and established consulting engineering sector involved in what can be considered best practice internationally. Those institutions and governments that were considered include the World Bank, the United States of America, the United Kingdom and Canada. The World Bank is considered to have a well-developed procurement system to regulate the procurement of service providers for the projects it funds. The USA argues for the procurement of consulting services based on skill and competence whereas the UK have abolished mandatory fee scales and allowed professionals to compete based on price. In Canada, there seems to be no clear indication on whether professionals compete based on price or competence and the industry seems to want to ensure that in the evaluation price is not the dominant factor. A review of procurement practices was also looked at in other sectors and arguments for and against price competition has been included in the review. The detail of each of these systems is described in further detail below.

2.9.1 The Argument for a Qualifications Based Approach

2.9.1.1 The World Bank

The World Bank funds development projects worldwide costing billions of dollars annually. For this reason, the Bank's procurement system should be robust to avoid abuse and corruptive practices. To this end, the World Bank has developed a set of guidelines for the selection and employment of consultants by World Bank borrowers (World Bank, Guidelines: Selection and Employment of Consultants by World Bank Borrowers [World Bank Guideline], 2004).

The main considerations guiding the World Bank Guideline (2004:2) policy on the selection process are as follows:

- The need for high quality services
- The need for economy and efficiency
- The need for competition amongst consultants
- The need for developing consultants in member (borrower) countries
- The need for transparency in the selection process

The World Bank believes these considerations are best achieved by competition amongst qualified consultants based on the quality of their proposals and where appropriate the cost of their services. Quality and Cost Based Selection (QCBS) of consultants is therefore the most commonly recommended method by the World Bank (World Bank Guide, 2004:2).

The World Bank recommends a shortlist of at least six consultants across a geographic region with at least one consultant from a developing country. The evaluation of consultants follows a two stage process where the technical proposal is evaluated first and thereafter the financial proposal. The evaluators of the technical proposal do not have access to the financial proposal until the technical evaluation is complete. Once the technical and financial evaluation is complete the scores are weighted and added to get a total score out of 100. The weight for the financial proposal is normally 20 out of 100 points depending on the nature of the assignment. The firm that scores the highest total points will be invited for negotiations before they are appointed (World Bank Guide, 2004:12).

The World Bank acknowledges that QCBS may not always be the most appropriate method of selection for all its projects. Other methods of selection that the World Bank may employ include (World Bank Guide, 2004:21-23):

- Quality based selection – this is used for complex or highly specialised assignments that have a high downstream impact and require the best experts; these assignments may also have the potential to be carried out in several different ways. Consultants selected for consideration may submit technical proposals only.
- Selection under fixed budget – this is used for assignments that are simple and the scope is precisely defined.
- Least cost selection – this is used for routine or standard assignments.
- Consultants' qualification selection – this method is used for small assignments that do not justify the preparation of competitive bids.
- Single source selection – this method is only used in exceptional circumstances as it does not promote competition and lacks transparency.

Once the selection of a consultant has been completed a contract will be entered with the successful entity. The World Bank considers the following forms of contract when engaging with service providers (World Bank Guide, 2004:27):

- Lump sum – these types of contracts are used mainly for assignments where the content and duration of the services are clearly defined and payments are linked to clearly specified outputs
- Time based – this type of contract is used when the scope and length of services are difficult to determine; it is normally used for complex studies or supervision of construction activities; time based contracts requires close monitoring to ensure payments are commensurate with services provided
- Retainer or contingency fee – these contracts are widely used when consultants are preparing companies for sales or mergers of firms
- Percentage fee – these contracts directly relate the fees paid to the consultant to the estimated or actual project construction cost, or the cost of the goods procured; they lack incentive for economic design and are hence discouraged
- Indefinite delivery - these contracts are used when there is a need to have "on call" specialized services to provide advice on an activity, the extent and timing of which cannot be defined in advance; it normally used for complex projects where cost rates are agreed up front and payment is made for actual time spent.

The World Bank also considers the appointment of individual consultants for assignments. This is done when there are no teams of personnel required and the work is highly specialised. A comparison however is still done between at least three candidates who may or may not be linked to a consulting firm. Once the selection of consultants is complete, the World Bank

will either appoint based on a lump sum, time based, retainer or contingency fee, percentage, or indefinite contract (World Bank Guide, 2004:31).

2.9.1.2 United States of America (USA)

The Brooks Act was enacted (USA, Public Law 92-582 [Public Law], 1972) by the United States Congress to establish Federal policy regarding the selection of firms or individuals to perform architectural and engineering services for the Federal Government. This established the procurement process of Qualifications Based Selection (QBS) for architectural and engineering services for all Federal projects.

The Brooks Act requires that all requirements for services are publicly announced and contracts for services are negotiated on the basis of demonstrated competence and qualification at fair and reasonable prices (Public Law, 1972, 1972:sec902). Firms submit a statement of qualifications and performance data annually. An evaluation of firms is done for a service and discussion is initiated with no less than three firms. A selection is done from the three firms considered for the assignment (Public Law, 1972, 1972:sec903). Based on the evaluation criteria, the highest qualified firm is selected and compensation is based on what is fair and reasonable considering the value of the project, scope, complexity and professional nature. If negotiations fail with the highest ranked firm, then negotiation will start with the second highest ranked firm. Allowance is made to approach additional firms should negotiation fail with all three firms selected (Public Law, 1972, 1972:sec904).

Selection is based on qualification, competence and experience and the competitiveness is the difference in their professional-technical qualifications rather than how much the firms are prepared to charge for their services or by how much they are willing to discount their services. The Brooks Act requires that the selection criteria are publicly available.

In 2009, the American Council of Engineering Companies (ACEC) and the American Public Works Association (APWA) commissioned a study by Paul S. Chinowsky PhD and Gordon A. Kingsley PhD entitled *An Analysis of Issues Pertaining to Qualifications Based Selection.* The study was a quantitative analysis of the use of QBS testing its impact, relevance, and implications. It also looked at the impact of QBS on project outcomes. The study highlighted that QBS remains the predominant procurement method for public agencies. This is emphasised by the fact that 47 states in the United States have some form of QBS law or regulation in place regulating procurement (Chinowsky & Kingsley, 2009:5).

Despite QBS being a legislated requirement in procurement it is being challenged. The role of price being brought in to the front end of selection is continuously being discussed. The option of a two-phased selection process is also being considered by various states in the US. The reasoning behind this is that designs are being standardised and the use of design prototypes, the prevalence of information technology making the transfer of designs between firms simpler, and the increased use of design build options in infrastructure provision that focusses more on direct financial competition rather than qualifications based competition (Chinowsky & Kingsley, 2009:6).

The following are the key findings of the study relating to QBS (Chinowsky & Kingsley, 2009:33-36):

- It ensures cost effectiveness – the study showed that QBS based projects have lower construction costs which is a key indicator of design impact on the constructed facility
- It lowers risk for complex projects – owners expressed special interest in using QBS on projects with higher risk
- It results in better projects and satisfied owners – 93% of owners surveyed on QBS rated the success of their final project as high
- It takes account of emerging societal issues – the study found that QBS was more likely to address issues such as sustainability
- It encourages innovation and protects intellectual property – the study confirms that QBS promotes higher levels of innovation
- It supports owner capacity building – QBS allowed owner organisations to gain specialised quality services and capacitating their staff.

The study concluded that QBS has a positive correlation with successful projects and therefore advocates that it should continue to be the procurement method of choice for publicly funded projects (Chinowsky & Kingsley, 2009:37).

2.9.1.3 Approaches in other Sectors

Stanley (2011) in his paper titled *The Competition Myth: Why Competitive Tendering Fails to Deliver*, argues against competitive bidding as a procurement method. He believes that it destroys any possibility of a good relationship between customer and supplier and advocates that the practice be abolished. Stanley (2011:2) cites the perceived advantages of competitive bidding as follows:

- It promotes competition between suppliers
- It promotes transparency and guards against favouritism and corruption
- In the case of open tendering it affords all tenderers the opportunity to win the business being advertised.

He however indicates that the disadvantages of the process far outweigh the advantages. He acknowledges that the disadvantages may not be applicable to all sectors and that it is looked at more generally. The disadvantages include:

- Leading suppliers may not tender – costs associated with putting together a bid; process may be perceived as not being fair; suppliers may be overcommitted with current contracts
- Barriers to communication between suppliers and customers – competitive tendering is not conducive to open communication
- Cost plus phenomenon – deviations to contractual terms can be expensive; suppliers tendering low to get the business and due to changes later it increases their price
- Use of cheaper, poor quality materials and or labour – in order for suppliers to remain competitive they compromise on the quality of their materials and labour which results in a poor-quality product or service
- Safety shortcuts – suppliers may compromise on safety to lower costs
- Competitive tendering can be slow – because of the transparent nature of the process it can take time to conclude the appointment of a supplier

- Suppliers who win the work but cannot meet the contractual requirements – due to lengthy evaluation periods and supplier organisational changes the supplier is unable to meet the contractual requirements
- The "300% mess around tax" – suppliers may be aware that customers are not serious about the tender they may have put out and may inflate their prices as reaction to this
- Lack of investment in research and development – due to low profit margins suppliers do not reinvest in their companies (Stanley, 2011:2-4).

Stanley (2011:5) argues for a better procurement model through:

- Research of the purchasing required
- Open communication with current and potential suppliers
- Purchasing decisions based on a strong relationship of trust
- Developing long term relationships with reputable suppliers
- Paying the supplier a fair profit margin

Stanley (2011:5) highlights the Toyota Production System in the USA in support of this model. Toyota built long term relationships with suppliers starting out small and based on performance suppliers would get increased business. He therefore recommends abolishing the system but acknowledges that for it to work, buy in from local government is essential.

2.9.2 The Argument for a Competitive Price Based Approach

2.9.2.1 United Kingdom (UK)

Historically the UK published mandatory fees scales for professionals involved in architecture, engineering and surveying which effectively prohibited competition on the basis of price. This however changed in the early 1980's. A report by the Monopolies Commission in 1970 recommended that each profession operating mandatory fee scales be the subject of a reference to the Monopolies Commission. The Royal Institute of British Architects amended its rules in 1982, the Royal Institute of Chartered Surveyors in 1984 and the Association of Consulting Engineers in 1984, effectively allowing their respective professionals to compete based on price. This was followed in the 1990's by the introduction of compulsory competitive fee tendering by the British Treasury. The British Treasury believed that competition was the best guarantee of quality and value for money. During this period compulsory competitive fee tendering had many critics both in the public and private sector. Issues of quality were raised, possible job losses in the industry and the whole system of the supply function that needed to be set up.

A task team was set up in 1997 under the leadership of Sir John Egan to do a review of the construction industry in UK. The task team had to look at ways of improving quality and efficiency in the industry. The task team produced a report *Rethinking Construction* (Egan, 1998). The report by the task team suggested that the industry should replace competitive tendering with long term relationships based on clear measurement of performance and sustained improvements in quality and efficiency. One of the greatest barriers to improvement highlighted in the report was the fact that clients selected designers based on price and there was a need for the industry to educate clients on the difference between best value and lowest price. The report (Egan, 1998:7) indicated that more than one third of major clients were dissatisfied with the performance of consultants in: coordinating multi-disciplinary teams, design and innovation, providing speedy and reliable services and in providing value for

money. The report (Egan, 1998:13) identified what it believed to be the drivers of change within the industry:

- Committed leadership
- Focus on the customer
- Integrate process and team around the product
- Quality driven agenda
- Commitment to people.

One of the overarching themes of the report was the issue of long term relationships. It believed that there was a value to collaborating in that it reduced time and costs on projects. The repeated selection of new teams inhibited learning, innovation and the development of skilled and experienced teams. For these long-term relationships to be successful some new approaches may be required (Egan, 1998:29):

- Look at new criteria for the selection of partners
- Do not only consider the lowest price
- Introduce a performance management system
- Improve continuity of workflow or at least a greater predictability of it.

The report concluded that for these recommendations to be implemented and succeed there had to be commitment from major clients, the industry and government.
Michael Hoxley (1998) undertook a study titled *The Impact of Competitive Fee Tendering on Construction Professional Service Quality.* The study was undertaken with the support of the Royal Institution of Chartered Surveyors and aimed to identify whether fee tendering had led to a decline in service quality. The recession of the early nineties caused fees to fall to unprecedented low levels with intense competition amongst professional firms and variations in price of up to four times the lowest bid. In 1991, there was an acknowledgement from the British government that low fee tendering needed attention and a measure of quality criteria needed to be included in the tendering processes (Hoxley, 1998:67). This was however only used as a qualifying criteria and evaluation thereafter would be solely based on price. In evidence given by the Association of Consulting Engineers to the Latham Commission in 1994 there was anecdotal evidence that fee tendering was having a negative impact on the services provided by their members. Hoxley (1998:73) argued that for competitive fee tendering to be successful we must ensure the following:

- Adequate specification of the services required at the time of going out to tender
- Careful pre-selection of tenderers
- Adequate weighting given to ability in the final selection process
- The quality / price ratio should also depend on the complexity of the project, innovation and flexibility

Through this Hoxley (1998:175) concluded the following:

- The implementation of a Quality Management System did not necessarily mean an improvement in service. Most consultants surveyed indicated that this was to improve their competitiveness
- The client's perception that service quality is lower on fee tendered appointments is not supported by the results of the study

- The perception that service quality is lower when fee tendering is more competitive and service quality is higher when the services required are well specified is also not supported by the results of the study
- The perception that service quality is higher when care is taken with pre-selection of tenderers and when adequate weighting is given to ability in the final selection processes is supported by the results of the study.

The Egan Report (1998) and the study conducted by Hoxley (1998) had similar general themes with which they concluded. These included new criteria for the selection of partners, considering the quality/price ratio depending on project complexity and adequately weighting ability in the final selection process.

A review of the Egan Report (1998) was undertaken in 2009. *Never Waste a Good Crisis* (Wolstenholme, 2009) was published and indicated progress or the lack thereof on the recommendations made in the Egan (1998) report. The review highlighted that one of the obstacles to implementing the recommendations of the previous report was the lack of government support. The review made the following recommendations on a possible way forward (Wolstenholme, 2009:26):

- Understand the Built Environment – small upfront design cost implications leverage much higher cost implications downstream (lifecycle costs) for the end user
- Focus on the environment – the industry must become a leader in sustainability
- Find a cohesive voice – various bodies and associations must collaborate in the best interest of the industry
- Adopt new business models that promote change – develop incentives
- Develop a new generation of leaders – visionary leaders that can communicate
- Integrate education and training
- Procure for value – move away from selecting based on lowest price.

The UK has seen a dramatic change in the way the public sector has procured the services of professionals over the past 30 years. It has gone from a system that was regulated with mandatory fee scales prohibiting competition amongst consultants, to a system outlawing mandatory fee scales and introducing a compulsory system whereby consultants compete based on price. From the Egan Report in 1998 to the Wolstenholme Report in 2009 very little progress is noted in improving procurement practices. For progress to be made it would therefore require firm and sustained government support.

2.9.2.2 Canada

In the Canadian procurement environment, professional bodies recommend QBS be used. This has however not been taken up significantly by federal, provincial, and local governments who still primarily use price based methods in the procurement of consulting services (Canada, Selecting a Professional Consultant [SPC], 2006:9). The discussion below gives an overview of the current Canadian procurement environment.

Dwight Hamilton (2001) published an article in the March / April edition of Engineering Dimensions titled *How Low Can You Go?* The article highlighted the plight of consulting engineers in Canada with specific reference to the Province of Ontario. The President of Consulting Engineers Ontario (CEO), Don Ingram, P.Eng, was interviewed to get a view on the state of the industry. Ingram argued that since the early nineties engineering firms were consistently bidding low fees to win work. This intense competition led to drastically reduced

prices, profits and often a reduced quality of service (Hamilton, 2001:27). Some of the consequences highlighted include:

- Much of the design work being done during construction
- Lack of project coordination amongst professionals
- Lack of urgency to deal with queries during construction
- Inexperienced staff managing work on site on behalf of the consulting engineer (Hamilton, 2001:27).

Due to the culture of low fee tendering one of the major liability insurers of engineers in British Columbia, Design Professionals Insurance Company (DPIC), insisted on a clause in their policies that required consultant's fees to be in line with fee schedules published by the Association of Professional Engineers and Geoscientists of British Columbia, failing which the consultant would not be able to be insured by them. Members of the Association of Professional Engineers and Geoscientists of British Columbia feel that a QBS process is more appropriate in the selection of consultants (Hamilton, 2001:28). This is like the system implemented in the USA after the enactment of the Brookes Act described previously.

In 2001, the federal government, through its Infrastructure Canada Program (IC) and the National Research Council (NRC) joined forces with the Federation of Canadian Municipalities (FCM) to create the best practice National Guide to Sustainable Municipal Infrastructure (InfraGuide). As part of this series of best practice guideline documents, Selecting a Professional Consultant was published in 2006 and one of its focus areas was that of decision making and investment planning. The impetus for this guideline was to look at re-introducing the concept of best value to consulting procurement and highlight that the cheapest price is not necessarily best value. The guideline notes based on the extensive international body of knowledge the most commonly recommended method of selecting professional consultants is QBS (SPC, 2006:9). Canadian professional bodies therefore recommend that QBS be the preferred method of selection for consultants but acknowledge that price based methods are still widely used within government. The guideline recommends a selection process that leads to the selection of the best qualified team for the assignment. It however does not preclude price from the selection process but rather encourages cost consideration in a more meaningful context. In promoting a QBS approach the guideline highlights the importance of understanding the elements that make up the project lifecycle costs. It notes the relative contributions as follows:

- Engineering design: 1-2%
- Construction: 6-18%
- Operation and maintenance: 80-93% (SPC, 2006:10).

This cost relationship underlines why it is important to start any project with the "right" or "best" consultant. The engineering design cost is small in comparison to the overall lifecycle cost but decisions made during the design process will have implications during the construction and operation and maintenance phases of the project. Engineering consultants should therefore be seen as "trusted advisors" who share priorities and interests in achieving the best outcomes for clients' projects.

In 2007, the Canadian Competition Bureau conducted a study into self-regulation of various professions (Canada, Self-Regulated Professions: Balancing Competition and Regulation [Balancing Competition and Regulation], 2007). The study however did not include engineering but was deemed to cover a wider spectrum than only the professions researched.

The Bureau argues that reducing regulation improves competition and thus productivity. They see competition as the best means to ensure that consumers have access to the broadest range of services at the most competitive prices. The following is seen by the Bureau as restricting competition:

- Qualifications – setting of unrealistically high standards is a means of restriction to entering the profession
- Mobility – limited recognition of qualifications internationally restricts mobility
- Business structure – restriction on the structure of multi-disciplinary practices
- Pricing and compensation – publication of fee guides restrict the ability of professionals to compete based on price; market forces should determine fee structures anyway (Balancing Competition and Regulation, 2007:133-136)

The Bureau acknowledges the need for regulation amongst the professions as this is important for protecting consumers. Regulation should however achieve its stated objectives and not negatively impact on competition (Balancing Competition and Regulation,2007:136).

The Bureau is focussed more on anti-competitive practices and the lowering of costs. Very little is mentioned regarding quality and how the lowering of costs may impact on the quality of the service or product being provided.

2.9.2.3 Price Competition in Other Sectors

Jensen & Payne (2002) looked at the effect of competitive bidding for audit services and published their paper *The Effect of the Introduction of Competitive Bidding in the Market of Audit Services.* It looked at the effect of the removal of a statue in the state of Florida prohibiting the disclosure of audit fee information in audit proposals prior to 1993. Previously auditees were required to rank prospective auditors based on non-price preference. Negotiations would then be entered into with the first ranked firm. If agreement could not be reached with the first ranked firm, the negotiations would continue with the second ranked firm and so on. The main reason for restricting competitive bidding was to prevent low quality audit services. This is however difficult to accurately assess as there are factors which may influence the nature of the audit exam such as client characteristics (Jensen & Payne, 2002:1).

In striking down Florida's competitive bidding regulation the court stated that there was no evidence to support that competitive bidding and lower fees would result in poorer quality of service (Jensen & Payne, 2002:3). When the restriction was lifted it resulted in:

- The availability of fee information increasing
- Audit fees increased at a significantly smaller rate
- Reduced fees being paid by municipalities
- Some of the bigger firms exiting this market
- Smaller firms competing on price to increase their market share (Jensen & Payne, 2002:13)

A similar trend is observed in the legal profession. What is more commonly referred to as "reverse auctions", legal departments in companies call for proposals for outside legal services through a digital online auction. Sylvia Hodges, professor at the Fordham Law School, notes that it is a trend that is here to stay. GlaxoSmithKline in 2008 introduced the practice with overwhelming success and significantly reducing its legal spend. They argue

that the process is very accommodating to all parties involved and significantly more efficient than the traditional Request for Proposals models (Hodges, 2012).

2.10 Concluding Comments on the Literature Review

From the literature, it becomes clear that the international approaches to the procurement of consulting services vary significantly. In the South African context, public sector procurement is well regulated and scope to manoeuvre within the legal requirements is limited.

In the local context, the argument for professional services to be procured on a competitive basis is made strongly post 1994. Unfortunately, in this approach, due to legislative changes, price dominates the decision-making process where expertise and experience is used merely as qualifying criteria and cannot be included in the final evaluation.

With government's intentions made clear through the establishment of the PICC and NPC, substantial human resources will be required to achieve an infrastructure spend of R4 trillion planned over the next 15 years. The study by Allyson Lawless clearly indicates that there are some hurdles to overcome to increase the capacity of the consulting engineering industry and local government to undertake this scale of infrastructure spend that is planned.

Over the past year though government has acknowledged that the public-sector procurement environment needs to be reviewed and the issues identified need to be urgently addressed. It is therefore encouraging to see the review of the public-sector procurement system by the National Treasury published in February 2015. Following on from the review the Model SCM Policy for Infrastructure Procurement and Delivery Management and the Standard for Infrastructure Procurement and Delivery Management was published. These National Treasury instructions starts aligning with international best practice and seeks to reintroduce the concept of quality back into the selection and evaluation processes for consulting services.

Internationally we see the arguments being made for and against competitive bidding. In the USA, it is illegal to compete based on price and a qualifications and cost based selection system is required for all federal and most state projects where a firm's relevant expertise and experience is evaluated in relation to the assignment before the price is evaluated. This gives a client some measure of comfort that the consultant under consideration has the necessary expertise and experience to undertake the work. QBS is also practiced internationally by the World Bank and is promoted in Canada as the preferred method of procurement for government. In the UK, however mandatory fee scales were abolished and competition based on price was introduced in the 1980's. The study by Hoxley did not find a correlation between low tendered fees and a decline in service quality but did indicate that service quality improved if more weighting was given to ability in the final selection process for consulting services.

The international literature shows that competitive bidding has become common in other sectors such as the financial and legal environments. More clients are calling for competitive bids for audit services and outside legal counsel. This is standard practice and seems set to continue as no adverse impacts have been noted since the concept was introduced.

The opposing views on the procurement of consulting services are important to understand as we move forward. The research will attempt to highlight the impact of price dominance in the process of the procurement of consulting services in South Africa.

3. Methodology

3.1 Introduction

The scientific method in research is the discipline which forms the foundation of modern scientific enquiry (Walliman, 2005:12). The methodology section will therefore highlight the method that has been followed in undertaking the research. There are five assumptions as described by Walliman (2005:12) which underlie the scientific method. The assumptions are briefly highlighted below:

- Order – this is the belief that there is some kind of order in the universe; this is linked to the idea of determinism which is the assumption that events have causes and links between events and causes can be revealed
- External reality – in order to gain an understanding of the world around us there must be agreement that an external reality exists
- Reliability – this is of human perception and intellect; dependence on the senses to measure and record work reliably
- Parsimony – that phenomena should be explained in as economic a manner as possible
- Generality – the assumption that there can be valid relationships between the particular cases being investigated and the general situation in the world at large.

If one accepts these assumptions, Walliman (2005:13) describes the characteristics displayed by the scientific method that distinguishes it from other methods of enquiry. They are:

- It is generated by a question
- It necessitates clarification of a goal
- It entails a specific programme of work
- It is aimed at increasing understanding
- It requires reasoned argument to support conclusions
- It is reiterative in its activities.

Despite the scientific method being widely used it is not necessarily the preferred method in all subjects. Walliman (2005:16) contends that some of the world's greatest thinkers have disagreed with the tenets of positivism contained in the scientific method. Positivism holds that every rationally justifiable assertion can be scientifically verified or is at least capable of logical or mathematical proof. The alternative or interpretivist approach to research is based on the philosophical doctrine of idealism (Walliman, 2005:17). It maintains that the view of the world around us is a creation of the mind i.e. we can only experience it through our perceptions which are influenced by our preconceptions and beliefs. We are therefore not neutral or disembodied observers.

Newman & Benz (1998:2) see qualitative and quantitative research as having philosophical roots in the naturalistic and positivistic philosophies respectively. Qualitative research is used when observing and interpreting reality with the aim of developing a theory that will what was experienced. The quantitative approach is used when begins with a theory or hypothesis and tests for confirmation or disconfirmation of that theory or hypothesis.

Walliman (2005:270) notes that there is a strong distinction between quantitative and qualitative research. The characteristics of the data collected for each differs and the methods used to analyse the data require different techniques. Quantitative analysis has traditionally been adopted by the natural sciences until its shortcomings became evident. It is exemplified

by social survey and experimental investigation. The researcher remains distant as an outsider collecting hard and reliable data. Qualitative analytical methods were therefore developed to take account of the soft, personal data that dealt with human feelings and emotions. It is therefore associated with participant observation and unstructured in depth interviewing. The qualitative researcher will attempt to obtain an inside view of the phenomenon getting as close to the subject of research in order to collect resonant, fertile data. The two methods could be used independently or together depending on the appropriateness to the research (Walliman, 2005:271).

In reviewing the method of data collection, the researcher looked at what the research was trying to achieve. This would then inform the method of collecting the data. Bell (1993:63) highlights that the method selected should produce the data required for the research and that the data collecting instruments should be designed accordingly.

Irrespective of the procedure for collecting data it should always be reviewed critically for its reliability and validity. Bell (1993:64) defines *reliability* as "the extent to which a test or procedure produces similar results under constant conditions on all occasions". Items on the questionnaire should be reviewed in view of possible ways of them being answered, the range of answers respondents may give and would the answers be different at different time periods. *Validity* tells whether an item measures or describes what it is supposed to (Bell, 1993:65). A test for this would be if another researcher would get similar responses using the same research instrument. Newman & Benz (1998:27) argue that research outcomes is of no value if the methods from which they are derived have no legitimacy. The methods must therefore justify our confidence.

3.2 Research Design

Research is about finding out things whether they be new to everyone or only some. Rugg & Petre (2007:61) indicate that research design is about finding things out systematically so that what you find out makes a useful contribution to knowledge. For different research questions, different research designs are needed. Below is a summary of some of the approaches highlighted by Rugg & Petre (2007:63-67):

- Non-intervention case study – this approach only studies what you see and is limited only to one sample
- Surveys – they try to find out how widespread things are; they ask some questions and scale up responses to give an estimate
- Field experiments – this is used to look at "what if" questions, make it happen and see how people respond; field experiments allow you to answer questions that cannot be answered with case studies and surveys
- Controlled experiment – this method can give you definitive answers to research questions; it is so designed to keep all stray variables out of the way.

Information in the form of facts or data is one of the essential raw materials of scientific research. Walliman (2005:241) highlights that data can be grouped in primary and secondary data. Primary data is derived from primary sources where the researcher can gain data by direct, detached observation or measurement in the real world undisturbed by an intermediary. Sources of primary data include instrumental readings, results of counting or measuring, reports of direct observations and recordings of experiences of those involved. Secondary data is that which has been subjected to interpretation. Sources of secondary data include writings in books, newspaper reports, articles and other publications. Secondary sources cannot be

described as being original and do not have a direct physical relationship to the event or subject being studied.
Data collection methods are numerous. The researcher must look at the practicality and the resources required for the various methods available. The output in terms of the type of data you will get out of each technique should also be considered. The following are data collection techniques described by Rugg & Petre (2007:100-151) which could be considered:

- Reports – this involves someone reporting what they or someone else did; reports are useful at giving insight not necessarily found in other techniques
- Observation – this can be divided into direct and indirect observation; it shows you something without the filtering effect of language
- Card sorts – this is done by preparing a set of cards relating to a particular topic; cards are given to respondents and they are asked to sort them based on criteria they select; the process can be repeated for different criteria
- Laddering – this deals with hierarchically arranged knowledge e.g. explanations may require sub explanations for technical terms which in turn may require further explanation
- Interviews – this should be a conversation with a purpose; they are useful for getting early insight into a topic; they can be structured, semi-structured or unstructured
- Questionnaires – ensure that you choose the correct set of questions; sufficient background work must be done to ensure the correct questions are asked; they are good for finding out how widespread something is; questions should be derived from the overall research question.

When conducting any kind of survey to collect information, the issue of representivity of the information collected normally comes into question. Is the sample representative of the population being studied? Is the sample size large enough to ensure meaningful analysis? Walliman (2005:280) puts forward that if the population is very homogeneous and the study is not very detailed then a small sample will give a fairly representative view of the whole. If greater accuracy is required then it makes sense to use a larger sample. This must however be tied back to practicality in terms of resources like cost, time and effort. Walliman (2005:276) highlights that there are two types of sampling viz. random and non-random sampling. Below is a summary of various random sampling methods (Walliman, 2005:276-278):

- Simple random sampling – this method is used when the population is uniform and has characteristics similar in all cases
- Simple stratified sampling – this is used when cases in the population fall into distinctly different categories
- Proportional stratified sampling – used when cases in the population fall into distinct categories of known proportion for that population
- Cluster sampling – where cases in the population form clusters by sharing one or some characteristics but are otherwise heterogenous
- Systematic sampling – this should be used when the population is very large and of known characteristics; units are selected in accordance with a predetermined system.

Non-random sampling is useful in certain studies but allows only a weak basis for generalisation. Non-random sampling can be described as follows (Walliman, 2005:279):

- Accidental sampling – this can also be called convenient sampling as you use what is immediately available to you from your surroundings; this sample is limited however as it is not representative

- Quota sampling – this is best described by reporters interviewing on the street; it attempts to balance the sample by selecting responses from equal numbers of different respondents
- Theoretical sampling – this is getting information from a sample that you think knows most about a subject e.g. a study on homelessness could concentrate on people living on the street.

The researcher decided on a mixed approach to the data collection process and a simple stratified sampling process to determine the sample size. A quantitative approach via questionnaires and qualitative approach via interviews and data mining was used. Although it could be argued that the questions in the questionnaire are of a qualitative nature as the research is aiming to understand human perception and feeling towards impacts on the consulting industry. Walliman (2005:284) does however note that questionnaires have their limitations as they cannot probe and only allow for one stage questions. Interviews are seen as particularly useful in the collection of qualitative data due to its flexibility and wide application (Walliman, 2005:284).

The data collection process was divided into six focus areas as listed below.

Study A – This was interviews with relevant and willing practitioners in both public and private practice. Interviews were arranged with industry practitioners both in the private and public sectors to understand the impact of the public-sector procurement system on their business.

Study B - Questionnaires to practitioners in the public sector. As they act mainly as clients a specific questionnaire (Annexure A) was developed relating to their business requirements.

Study C – Questionnaires to practitioners in private practice. They act mainly as consultants and the questionnaire (Annexure B) was designed around how they operate.

Study D - Relevant court cases. The possibility of reviewing court cases and legal proceedings involving consultants was considered in the data collection process. Cases would be reviewed for their relevance to the study.

Study E - Professional indemnity (PI) claims. Another indicator of the quality of work of consultants includes statistics relating to professional indemnity insurance. The level movement of PI claims over the past few years relating to a similar timeline of the changes in the public-sector procurement environment.

Study F – CESA / City of Cape Town Liaison Committee. The researcher's involvement in this committee gave valuable insight into the issues in the broader consulting engineering environment and in the public sector. Proposed initiatives out of this committee has also been noted.

3.3 Data Collection Process

Study A
The researcher contacted various practitioners in the public and private sectors but very few were willing to be interviewed on the record regarding the current public sector procurement system. An interview was however conducted with a former senior executive of the City of Cape Town's Transport Roads and Stormwater Directorate.

Study B
For the data collection via the public sector surveys the researcher decided to contact IMESA for practitioners in the public sector. Contact was made with the President of IMESA. Permission was granted for their members to be contacted. It was agreed that there would be one point of contact and that correspondence and communication would be via this contact. IMESA distributed the questionnaire on behalf of the researcher to all its Technical Directors. Only two responses were received from the IMESA Technical Directors of which only one could be used. Due to the poor response rate from the IMESA Technical Directors, the researcher decided to identify practitioners in the public sector. Questionnaires were sent to officials at public authorities; namely the City of Cape Town, George Municipality, City of Johannesburg, the City of Tshwane, the City of eThekwini, Nelson Mandela Bay Metropolitan Municipality, Western Cape Government: Department of Transport and Public Works, Airports Company South Africa Cape Town, and the South African National Roads Agency Limited Western Region. The responses were considerably better and 38 additional responses were received. Unfortunately, no responses were received from public sector officials outside of the Western Cape.

Study C
To reach as many practitioners as possible the researcher contacted the CEO of CESA to gain access to their members. CESA has an established supply chain management committee made up of consulting engineers and legal practitioners. The procurement manager at CESA coordinates the work of this committee. With the consent of the committee questionnaires were sent out to 10 of their members who were consulting engineers. From the ten members contacted only three responded. Due to the poor response questionnaires were also sent to private practitioners in Cape Town, Knysna, Johannesburg, Durban, and Port Elizabeth. This improved the overall response rate for the private sector but again very few responses were received from outside of Cape Town.

The total responses received for Study B and C were 42 of which 33 participated in the survey. One survey response questionnaire was not used because it was not clear whether the respondent was a consultant or public sector official. The table below summarises the responses received and relate to the individual responses received.

Table 5 Summary of survey responses for Study B and C

Responding Group	Sample Size	Responses (No)	Response Rate (%)	Participating	Not Used
Study B	47	27	57.45%	24	1
Study C	34	15	44.12%	9	0
Total	**81**	**42**	51.85%	**33**	**1**

Study D
In understanding how to approach the information available from court cases, a discussion was held with the Head of Legal and Risk RSA at WorleyParsons. One option was to look at the Law Reports but this would however have given a distorted result as only a small percentage of cases actually get to trial and then a small percentage of these (around 10-15%) gets reported (Head of Legal and Risk RSA, WorleyParsons, 2013). A more common occurrence is that consultants commence a court application but the matter gets settled before it gets to court. The settlement agreement would normally also contain a confidentiality clause

and the detail of the case would therefore not be available to the public. Another more accurate approach would be to go to the Registrar's Office at each High Court across the country and get permission from the court to consider daily court rolls for the years under review. One would have to have a good understanding of the consulting engineering industry to identify consultants on the role. To get the detail of the case you would then have to draw the file for each case identified. To do a review of the court rolls it would require extensive resources – human, financial and time – to complete this exercise. This data collection method was not pursued further.

Study E

For information relating to professional indemnity claims, contact was made with Aon Consulting formerly Glenrand MIB. Due to the nature of their business they were not keen to supply detailed information relating to PI claims. They did agree to share their broad statistics of claims over a period. The researcher was also referred to Aon's annual publication which they put together with CESA highlighting examples of construction industry claims and lessons to be learnt from this. The annual publications available for review were 2010, 2012, 2013 and 2014. In 2012, ECSA, as part of the learning process and information sharing, also published four articles in the SAICE magazine relating to claims against consulting engineers. These articles were published in the March, April, May and June editions of the SAICE magazine. These publications and statistical information from Aon have been consulted to understand if there is any correlation between the current public sector procurement system and low fee tendering and professional indemnity (PI) claims.

Study F

Due to the researcher's involvement in the CESA / CCT Liaison Committee it was decided to use these discussion and decisions coming out of these meetings as part of the data collection process. The purpose and background to this committee is that it serves as a forum for the consulting engineering industry and the City of Cape Town to meet and discuss matters of mutual benefit, interest, and concern. The committee meets twice a year and is represented by CESA members in the Western Cape and senior officials from the City of Cape Town from their Transport for Cape Town, Utility Services (Water, Sanitation, and Electricity) and Housing Directorates. The main topic of discussion at the past few meetings has been that of procurement. Through the work of the committee and inputs from CESA member firms it was decided that the Western Cape Branch should lead an initiative to seek clarity via the legal system on the sections of the Constitution that deals with procurement. The motivation was that sections dealing with economic, efficient, cost effective and competitive had to look at broader aspects than just financial and should include concepts of expertise and experience. A proposal was formulated for consideration by the national CESA executive.

The data collection process has been challenging. Despite public sector procurement being topical, it has become clear that consultants and officials do not enjoy filling out questionnaires and responding to surveys even with organisational support and buy in for the study. Furthermore, clients and consultants do not like going on record to discuss procurement issues as it is seen as a sensitive topic. The respondents who did reply to the survey and those who agreed to be interviewed are largely from the Western Cape and inputs from other regions in the country were very limited. The data is therefore not necessarily representative of what is happening across the country.

3.4 Data Analysis

Data analysis forms an integral part of research. The data analysis methods must be in relation to the nature of the research problem and the specific aims of the research project. Walliman (2005:301) gives reasons for why we analyse data:

- To measure
- To make comparison
- To examine relationships
- To forecast
- To test hypothesis
- To construct concepts and theories
- To explore
- To control
- To explain.

Rugg & Petre (2007:152) demonstrate some ways of analysing data:

- Content analysis by basic tabulation – this involves identifying categories that can be used to tabulate responses; the categories can be derived from the research question, the literature or the data gathered
- Discourse analysis – tends to be more about activities and structures than content analysis; widely used in media studies to uncover underlying social assumptions that often get overlooked
- Knowledge representation – the core idea here is that knowledge is not homogeneous; there are different types of knowledge and different ways of describing, classifying and representing that knowledge; numeric scales are often used to represent the data
- Statistics – this is the science of collecting and analysing numerical data or systematic collection or presentation of such data; there are two types of statistics viz. descriptive and inferential

Data can be analysed quantitatively or qualitatively. Quantitative analysis the syntax of mathematical operations to investigate the properties of data (Walliman, 2005:302). There are different types of measurement and you can do different things with the different types. The levels of measurement used in the collection of data include nominal, ordinal and ratio. They are an important factor in choosing which type of analysis is applicable. Descriptive statistics provides a method of quantifying the characteristics of the data. This can be done by finding the mode or median and the mean (Walliman, 2005:304). The main purpose is to identify and quantify the relationships between variables. Inferential statistics goes beyond describing the data. It is used to produce predictions through inference based on the data analysed (Walliman, 2005:305). In qualitative analysis, the researcher immerses himself in the data and searches out patterns and inconsistencies that will generate new concepts and theories (Walliman, 2005:308). This is based on Grounded theory described by Walliman (2005:308) as the discovery of theory from data with the aim of developing a theoretical hypothesis. The process is iterative and consists of continuous comparison of data.

4. Results: Presentation and Discussion

Walliman (2005:304) describes statistics as the science of collecting and analysing numerical data. It is also the systematic collection or presentation of such facts. Statistical methods deal purely with quantitative data or with qualitative data which are expressed in numerical terms. Descriptive statistics provides a method of quantifying the characteristics of the data (Walliman, 2005:305). It can be used to examine the following:

- Central tendency – where the data tends to fall as measured by the mean, median and mode
- Dispersion – how spread out the data is as measured by the variance and the standard deviation
- Skew – how concentrated data is at the high or low end of the scale as measured by the skew index
- Kurtosis – how concentrated data is around a single value as measured by the kurtosis index (Texas State Auditor's Office, 1995:1).

The Texas State Auditor's Office (1995:1) describes variables as quantities or qualities that may assume any one of a set of values. Variables may be classified as follows:

- Nominal – these use names, categories or labels for qualitative values like gender, ethnicity or job title
- Ordinal – these are also categorical variables however the order or rank of the categories is meaningful; an example is that people could be asked to rate the service at a restaurant on a scale ranging from poor to excellent; these categories could be converted to a numerical scale for further analysis; most of the data collected in this study can be considered as ordinal
- Interval – these are purely numerical values e.g. age or income
- Ratio – values have the advantage of regularity; there is a regular value between one value and the next.

Some of the advantages and disadvantages mentioned by the Texas State Auditor's Office (1995:11) are listed below:

- Advantages – can be essential for arranging and displaying data; can form the basis of rigorous data analysis; can be rendered both numerically and graphically; can form the basis for more advanced statistical methods.
- Disadvantages – can be misused, misrepresented and incomplete; can be of limited value when samples are small; it demands a fair amount of calculation and explanation; it offers little information about causes and effects; it can be dangerous if not analysed completely.

Descriptive statistics are used when the objective is to describe and discuss a data set more generally and conveniently than would be possible using raw data alone.

The results presented hereunder represent the feedback received from public sector officials and consulting engineers in private practice through the questionnaires sent to them. It also

represents feedback form interviews held with various officials. The data is presented in line with the research objectives set out in Chapter 1.

4.1 Contextual Information

In the survey respondents were asked questions relating to context for the areas in which they operate. Below is a summation of this contextual information.

4.1.1 Public Sector Respondents

The questionnaire (Annexure A) was sent to 47 public sector officials at national, provincial and local government level as well as parastatals requesting them to complete and return the form to the best of their knowledge and understanding. The questionnaire dealt with 6 focus areas or questions for the public sector:

- The disciplines of municipal services they are involved with e.g. roads and stormwater, water services and electricity
- The method of procurement used by their institution
- The types of procurement methods with which they have experience
- The type of procurement method, in their opinion, that would provide the best long term value for money
- How the contributions by consulting engineers changed with respect to technical delivery, quality of design and documentation, innovation, testing of alternatives and value engineering, attention by senior staff and transfer of skills
- In the procurement of consulting engineering services how should the emphasis be placed on other criteria over and above that of BBBEE e.g. price, expertise, experience and capacity.

The 24 respondents who participated in the survey surveyed cover a broad spectrum of engineering services with most of them being involved in transportation, roads and stormwater. To a lesser extent some were involved in water and sanitation engineering and building structures and electrical and mechanical engineering. The most widely used method of procuring consulting services by the public sector is by price based competition. Most respondents also had experience with the various procurement methods in use.

4.1.2 Private Sector Respondents

The questionnaire (Annexure B) was sent to 34 private sector consultants requesting them to complete and return the form to the best of their knowledge and understanding. Fifteen consultants responded and 9 consultants completed the questionnaire. The questionnaire for consultants dealt with ten focus areas or questions:

- Size of the firm in South Africa
- Number of disciplines the respondent is responsible for
- Client base in South Africa viz. private sector, public sector and public entities
- Method of procuring work in South Africa
- Percentage of turnover spent on training
- Perceived discounts to the ECSA fee scales
- With the pressure on fees, how has this impacted on delivery
- Would there be value add if fees were to be increased

- Loss of staff under the age of 35
- Reasons for these staff members leaving your firm.

CESA defines small to medium firms having 50 or less employees and medium to large firms having 51 or more employees. The sizes of the firms surveyed varied from small to large and they offered the traditional infrastructure disciplines of roads, water, structures, electrical and mechanical services. Firms do work in both the public and private sectors and is a split of 60/40 public/private. Firms procure approximately 60% of their work on a price based competitive basis with the remainder sourced on direct appointments, negotiation and roster appointments.

4.2 The impact of the current public sector procurement system on the sustainability of the consulting engineering industry in terms of the survival of consultants, expansion of services, mentoring and training, attracting high quality staff and cutting edge technology

4.2.1 Change in percentage of turnover spent on training

Consultants were asked to indicate by how much their expenditure on training, as a % of turnover, has changed over the past 5 years? (Average over the period).

Table 6 Training Investment

Range	Respondents	Assumed Value	Respectively Value
Reduce > 10%	2	-15	-30
Reduce 5 - 10%	1	-7.5	-7.5
More or less the same	2	0	0
Increase 5 - 10%	2	7.5	15
Increase > 10%	2	15	30
Total	9		7.5
Weighted Average			0.8

Five out of the 9 respondents did not vary their spend on training by more than 10% either up or down and 2 respondents decreased their spend by more than 10%. There is therefore no significant positive movement in the spend on training by consultants. The trend could be attributed to the pressure on fee earnings and the competitive rate at which consultants are pricing their work. Only 2 respondents decreased their training spend by more than 10%.

4.2.2 Loss of staff

Consultants were asked to comment on what percentage of staff aged <35 years old their firms have lost in the last 5 years.

Table 7 Staff Losses under the Age of 35

Range	Respondents	Assumed Value	Respectively Value
0 - 5%	2	2.5	5
5 - 10%	5	7.5	37.5
> 10%	1	15	15
Total	8		57.5
Weighted Average			7.2

* One respondent did not comment on this question

Generally, respondents have lost staff over the past 5 years in the age category less than 35 years. Most respondents have indicated that they have lost staff in the 5 – 10% range. Staff in this age category are important to delivery on projects and are key to successful succession planning and therefore the long-term sustainability of the organisation.

4.2.3 Reasons for staff losses under the age of 35

Consultants were asked to rank the possible reasons why young, qualified professionals typically <35 years old, leave the consulting engineering profession

Table 8 Reasons for Staff Losses

Company	**How would you rank the possible reasons why young, qualified professionals typically <35, leave the consulting engineering profession**					
	Work is boring	**Not financially rewarding**	**Risks are too great**	**Better opportunities in other sectors**	**Industry too cyclical**	**High expectations for early promotion**
C1	4	1	5	2	3	6
C2	5	3	6	1	4	2
C3	4	3	5	1	2	6
C4	5	3	4	1	2	6
C5	5	3	4	1	2	6
C6	4	1	5	2	3	6
C7	5	1	4	2	3	6
C8	2	1	5	3	4	6
C9	5	1	4	2	3	6
Average	4.3	1.9	4.7	1.7	2.9	5.6

The following possible reasons were given in order of their preference:

1. Better opportunities in other sectors
2. Not financially rewarding
3. Industry too cyclical
4. Work is boring
5. Risks are too great

Younger staff look for better opportunities for their career. If they cannot see this happening in the company they are working for they will look elsewhere. One respondent also cited high expectation for early promotion as one of the main reasons younger staff leave their company.

The inability of companies to retain their younger staff makes it difficult to plan for succession and ultimately the survival of these companies into the future. It also limits their ability to expand their services. Respondents cited their main reasons for staff leaving is that there are better opportunities in other sectors and that the sector is not financially rewarding. This can be linked back to consultants having to bid for work on the open market and the competitive nature of the fees being bid.

4.3 The impact of the current public sector procurement system on the quality of service provided by the consulting engineering industry in terms of quality of designs, appropriate use of staff in design and implementation stages of projects

4.3.1 Perceived changes in consulting services

Public sector participants were asked to what extent the following contributions by consulting engineers have changed on projects during the past ten years for which they have personal knowledge or responsibility.

Table 9 Perceived Changes in the Quality of Consulting Services

	Much worse	A little worse	More or less the same	Better	Much better	Value	Average
	1	**2**	**3**	**4**	**5**		
Re-use of standard documentation	4	1	13	5	0	65	2.8
Quality of documentation	3	6	10	4	0	61	2.7
Innovation & new products	3	5	12	3	0	61	2.7
Value for money	1	11	7	4	0	60	2.6
Technical delivery	0	14	5	4	0	59	2.6
Quality of design	2	9	9	3	0	59	2.6
Value engineering	4	7	9	3	0	57	2.5
Transfer of know-how & sharing of ideas	5	8	8	2	0	53	2.3
Testing of alternatives	6	9	5	3	0	51	2.2
Attention by senior/ experienced staff	4	13	6	0	0	48	2.1

The 23 respondents gave a view on how the contributions by consulting engineers have changed over the past ten years for projects in which they have been involved. They were asked to rate various aspects as listed above.

Respondents rated attention by senior staff, testing of alternatives, transfer of knowledge and value engineering as having gotten a little worse. This can be correlated to the pressure on fees caused by tendering. Projects cannot carry the costs of development and training of staff.

None of the respondents indicated that contributions by consulting engineers have become much better further highlighting the pressure on staff to deliver projects with the least amount of effort.

4.3.2 Low fees versus ability to deliver

Consultants were asked to comment on how they feel the pressure on fees, due to price based competitive bidding impacted on their ability to deliver on projects i.e. their staff composition and resourcing.

Table 10 Low Fees and the Impact on Delivery

	Much less	A little less	More or less the same	More	Much more	Value	Average
	1	**2**	**3**	**4**	**5**		
Re-use of standard solutions	0	0	1	5	3	38	4.2
Time spent by senior experienced staff at concept development	4	2	2	0	1	19	2.1
Time for research & innovation; new product development	8	0	3	0	0	17	1.9
Value engineering incl optimisation of design for construction; operation & maintenance	6	2	1	0	0	13	1.4
Client capacity development	7	2	0	0	0	11	1.2
Opportunities for junior staff to spend time learning on the project	8	1	0	0	0	10	1.1
Testing of alternatives	8	1	0	0	0	10	1.1

Respondents were asked to give a view on how their ability to deliver has been impacted by price based competitive bidding.

Consultants engage less in the testing of alternatives, less training of graduate staff occurs, there is no time to build capacity within client bodies, no value engineering occurs, no time for research and development and minimal time for senior staff to guide the development of concepts. Due to this pressure, there is an increase in the re-use of standard solutions with very little opportunity for innovation and new product development.

Overall the perception is that the quality of service has deteriorated and not sufficient time is spent on design development. The inappropriate use of staff on projects has contributed to this with very little value add to clients.

4.4 Establish the dominance of price in the evaluation of bids and the effect this has had on the consulting engineering industry (Consultants view)

4.4.1 Perceived discounts to ECSA fee scales

Consultants were asked to comment on how much lower, on average, than the ECSA fee scales were the successful bids where price based competitive bidding is the norm i.e. what are the perceived discounts to the ECSA fee scales.

Table 11 Discounts Related to ECSA Fees

Company	On average, how much lower than the ECSA fee scales were the successful bids where price based competitive bidding is the norm i.e. what are the perceived discounts in % compared to ECSA fee scales						
	Roads	Water & Sanitation	Civil Engineering Structures	Building Structures	Electrical	Mechanical	Transportation
C1							30
C2	30	50	30	30	30	30	
C3	50	50	30	30			
C4	30	30	10	30		10	
C5	50	50	50	50	50	50	
C6	50						
C7	10	10					
C8	50	50	50				
C9					50	30	
Average	38.6	40.0	34.0	35.0	43.3	30.0	30.0

Legend:
10 = < 20% discount
30 = 20 – 40% discount
50 = > 40% discount

Respondents were asked to comment, where bids were successful, on the perceived discounts to the ECSA fee scales. They were asked to give an indication by discipline on the average discounts offered by bidders.

Larger discounts were offered by respondents in the Electrical, Water & Sanitation and Roads disciplines. This could be considered as routine engineering with most consultants being able to do this type of work efficiently. Lesser discounts were offered in the Building Structures, Civil Structures, Mechanical and Transportation disciplines. Some of this type of work could be considered more specialised or the work could be more of an iterative nature e.g. building structures where a building could go through three designs before a final design is considered. The common discount range is the 20 – 40% range.

4.4.2 Perceived value add if fees were increased

Consultants were asked to indicate how much value they anticipate being added, if fees were to be increased by 10 – 20%.

Table 12 Value Add for Increased Fees

Company	Given the pressure on time & resources brought about by price-based competitive bidding, how much value do you anticipate to be added, if fees were to be increased by 10-20%			
	Reduction in capital costs due to improved designs, contract documentation & supervision	Reduction in project life cycle costs due to improved designs, contract documentation & supervision	Improvement in sustainability of projects (reduced energy consumption, less maintenance, longer useful life)	Improvement in job opportunities during construction i.e. more labour intensive construction
C1	15	15	15	15
C2	15	15	15	7.5
C3	2.5	15	15	5
C4	15	15	15	15
C5	7.5	5	15	2.5
C6	15	15	15	15
C7	15	7.5	2.5	7.5
C8	15	15	15	15
C9	15	15	15	15
Average	12.8	13.1	13.6	10.8

Legend:
5 = 0%
2.5 = 0 – 5%
7.5 = 5 – 10%
15 = > 10%

Consultants view a fee increase of 10 – 20% as having a general perceived increase in value-add of services. Reduction in capital and lifecycle costs, improvement in sustainability of projects and improvement of job opportunities during construction is seen as improving due to improvement in designs, contract documentation and construction monitoring all tend to the upper side of the 5 – 10% range. Consultants could engage in value engineering, mentoring and training due to the 10 – 20% fee increase.

4.5 Establish the dominance of price in the evaluation of bids and the effect this has had on the consulting engineering (Public sector officials' view)

4.5.1 Procurement method that would provide best long term value for money

Public sector respondents were asked their view on which procurement method would provide best long term value for money on projects for the Municipality.

Table 13 Procurement Method Providing Best Long Term Value for Money

Company Name	Price Based	Selection Based	Project Appointment	Roster	Negotiation	Other
PS1	2.8	1	2.8	2.8	2.8	2.8
PS2	2.8	1	2.8	2.8	2.8	2.8
PS3	2.8	1	2.8	2.8	2.8	2.8
PS4	2.8	1	2.8	2.8	2.8	2.8
PS5	3	1	3	2	3	15
PS6	2.8	2.8	1	2.8	2.8	2.8
PS7	2.8	1	2.8	2.8	2.8	2.8
PS8	2.8	1	2.8	2.8	2.8	2.8
PS9	5	1	3	2	4	15
PS10	2.8	1	2.8	2.8	2.8	2.8
PS11	2	1	3	3	3	3
PS12	2	1	3	3	3	3
PS13	4	1	2	5	3	15
PS14	2.8	1	2.8	2.8	2.8	2.8
PS15	2	1	4	3	5	5
PS16	5	1	4	5	3	2
PS17	2	1	3	3	3	3
PS18	2.8	1	2.8	2.8	2.8	2.8
PS19	2	3	3	1	3	3
PS20	5	1	4	3	2	15
PS21	2.8	1	2.8	2.8	2.8	2.8
PS22	4	1	3	2	5	15
PS23	5	1	2	4	3	15
Average	3.1	1.2	2.9	2.9	3.1	6.1

Legend: Ranking 1 to 5 where 1 would provide best long term value and 5 would provide least long term value. It is assumed that there are 15 points to distribute between the various options.

Selecting a consultant based on qualification, experience and expertise was ranked highest by the 23 respondents. Project appointment and roster appointment was ranked as the next most appropriate methods of appointment by respondents. Negotiation and price based appointments were ranked less favourably. Selecting a consultant based on experience, expertise and qualifications with some element of pricing is perceived to be the most appropriate.

4.5.2 Other criteria for consideration

Public sector respondents were asked to comment on how the emphasis should be placed over and above BBBEE criteria in the procurement of consulting engineering services

Table 14 Additional Criteria for Focus

	Routine detail design					Normal projects using mainly one discipline					Complex projects, requiring innovation using untried ideas & more than usual risk					Mega projects, multi disciplinary, large economic, social & environmental knock-on effects					Feasibility & viability studies which may act as Go/No-go gates or fundamentally influence the concept design				
Company	**Price i.e. Fees**	**Expertise**	**Experience**	**Capacity**	**Other**	**Price i.e. Fees**	**Expertise**	**Experience**	**Capacity**	**Other**	**Price i.e. Fees**	**Expertise**	**Experience**	**Capacity**	**Other**	**Price i.e. Fees**	**Expertise**	**Experience**	**Capacity**	**Other**	**Price ie Fees**	**Expertise**	**Experience**	**Capacity**	**Other**
PS1	100					100						50	50				33	34	33			100			
PS2	40	5	15	40		40	5	15	40		5	40	15	40		5	40	25	30		5	40	40	15	
PS3		30	40	30			40	40	20			50	50				25	25	50			50	50		
PS4			50	50			25	50	25			50	25	50			20	50	30			50	50		
PS5	20	10	30	40		15	15	30	40		5	40	30	25		5	40	40	15		5	60	30	5	
PS6			60	40			25	50	25			50	40	10			40	40	20			40	40	20	
PS7	20		40	40		20		40	40		20	60	20			10	40	30	20		10	40	40	10	
PS8	50	10	20	20		50	10	20	20		40	20	20	20		40	20	20	20		50	25	20	5	
PS9	50	15	20	15		50	20	15	15		20	35	25	20		15	30	30	25		25	30	30	15	
PS10	20	25	25	30		10	30	30	30			40	40	20			40	40	20			40	40	20	
PS11	25	30	20	25		30	30	15	25		30	25	20	25		30	25	20	25		20	35	20	25	
PS12	65	10	10	10	5	65	10	10	10	5	65	15	10	5	5	65	15	10	5	5	65	15	10	5	5
PS13	25	25	25	25		25	20	30	25		20	30	30	20		25	25	25	25		25	20	30	25	
PS14	10	50	30	10		10	40	30	20		10	30	40	20		10	30	30	30		10	50	30	10	
PS15	80	10	5	5		80	10	5	5		60	20	10	10		60	20	10	10		70	10	10	10	
PS16	50	20	20	10		40	20	20	20		25	25	25	25		20	25	25	30		20	30	30	20	
PS17	60	10	10	20		60	10	10	20		40	20	20	20		30	30	20	20		30	30	20	20	
PS18		25	25	25	25			30	30	40		50	25	25			30	30	30	10		30	30	30	10
PS19	60	10	15	15		60	10	15	15		50	20	20	10		50	20	20	10		50	20	20	10	
PS20	10	30	30	30		20	10	40	30		20	40	20	20		20	30	20	30			50	25	25	
PS21	30	15	15	30	10	30	10	10	40	10	45	20	20	15		30	20	30	15	5	25	20	20	25	10
PS22	20	20	20	40		10	60	20	10		10	40	40	10		10	40	40	10		10	50	30	10	
PS23		50	50				40	30	30			70	30				60	20	20			60	20	20	
Average	32	17	25	24	2	31	19	24	23	2	20	37	27	17	0	18	30	28	23	1	18	39	28	14	1

With the current evaluation system for bids restricted to pricing and BBBEE preferencing criteria only, respondents were asked how the emphasis should be placed on price, expertise, experience and capacity for various categories of work. BBBEE currently has a weighting of 10% for bids under R1m and 20% for bids over R1m.

In routine engineering projects price is considered to play a bigger role because many consultants will have the skills to undertake the work. When the projects become more complex or larger scale price should start to play a lesser role in determining the appointment of a consultant or team. Expertise, experience, and capacity should play a bigger role in determining the selection of a consulting engineer for larger and more complex projects.

In addition to the surveys an interview was conducted with a former Senior Executive for Transport Roads & Stormwater at the City of Cape Town. The discussion was around his experience with consultants and their services since the introduction of the new procurement system. Some of the issues raised included:

- Non-engineers preparing bid specifications
- Sensitivity around skills and qualifications of SCM staff
- Heads of technical services department in local authorities
- Qualitative assessment of consultants rather than price driven
- Undercutting of fees has had an impact on the quality of service being provided
- Clients do not get to deal with senior staff at consulting companies anymore
- Quality should be a consideration in the appointment of consultants.

From the interview, it was clear that price dominance in the evaluation process and the discounting of fees by consultants was seen as contributing to the issues raised above.

In reviewing the information received from AON with respect to their PI claims there was no conclusive evidence that a correlation could be drawn between the procurement system and PI claims. No further analysis was therefore undertaken due to the unavailability of information on PI claims.

Through the Western Cape CESA / CCT liaison committee a proposal to mount a legal challenge to sections of the Constitution was formulated. The proposal sought to get clarity through the legal system on the following phrases in the relevant sections of the Constitution that had a bearing on procurement:

- Paragraph 152 (1) – “provision of services in a sustainable manner”
- Paragraph 195 (1) – “efficient, economic and effective”
- Paragraph 217 (1) – “competitive and cost effective”.

The intention of this initiative was to get quality and functionality reintroduced into the evaluation and selection process for consulting services. The CESA national executive at the time believed this to be an expensive route to follow and it was therefore not pursued.

4.6 Concluding Comments on Results

From the public-sector survey results, we see that most respondents are familiar with the common methods of procuring consulting services. The most widely used method though, is price based competition. The overwhelming choice of respondents for a method of procurement is selection based on qualification, experience, and expertise. Respondents felt that the biggest perceived negative change in approach by consultants was the reduced attention by senior staff given to projects. Transfer of knowledge and training of graduate staff followed this. In their response to additional criteria and the weighting thereof, the response was again in favour of expertise, experience, capacity, and location rather than price.

Consultants procure two thirds of their work in the public-sector market and one third from the private sector market most of which is procured on a competitive tendering basis. This has resulted in significant discounts on gazetted fees mostly in the roads and water sectors. With the low fees tendered it has had an impact on consultants' ability to deliver on projects. Time spent by senior staff, training of graduates, on testing of alternative designs and time for research and development have all become less. Low fees tendered also have an impact on retaining staff under the age of 35. The main reasons cited by consultants for this age group of staff leaving their organisations is that the industry is not financially rewarding and that there are better opportunities in other sectors.

5. Conclusions

From the literature, it is clear that within a South African context competitive bidding for consulting services is an integral part of SCM and the appointment of consulting engineers. Unfortunately, the competition is price driven with qualitative criteria relegated to a gate keeping mechanism only. Engineering consultants are comfortable to compete for work but they believe competition should be based on their skill and ability. Expertise and experience considerations should therefore be brought back into the evaluation of bids. There has however been an acknowledgement on the part of Government that the current procurement system for consulting services needs to be looked at. This process culminated in the publication of the Supply Chain Management Review in February 2015 by the National Treasury. The review is a frank look at the status and highlighting areas requiring improvement with some of these already being implemented.

In considering the research objectives that were set, below is a discussion on how these objectives were met through the study.

Objective 1: The impact of the current public sector procurement system on the sustainability of the consulting engineering industry in terms of the survival of consultants, expansion of services, mentoring and training, attracting high quality staff and cutting edge technology.

The survey results indicate that low fee tendering ultimately has an impact on the ability of a firm to pay its staff. Most firms have lost between 5 – 10% of their staff under the age of 35 over the past 5 years. The top two reasons cited by consultants are that the industry is not financially rewarding and that there are better opportunities in other sectors. This limits a firm's stability to plan for expansion and succession. The lesser experienced staff are also being impacted by the low fees tendered as they no longer have proper training and mentoring opportunities. This is confirmed by the 8 of the 9 consultants who indicate that they now spend less time training graduate staff and to some extent spent less of their budgets on training. The low fee regime has also resulted in consulting engineering companies reducing their size, limiting their investment in new technology.

The issue of a lack of skill and capacity is highlighted by Alison Lawless in her study. This is relevant in the context of governments intention to commit significant financial resources to spending on infrastructure. The low fee tendering exacerbates this problem of skills shortage and inhibits the industry's ability to attract new graduates and retain existing ones to develop their careers.

Objective 2: Determine the impact of the current public sector procurement system on the quality of service provided by the consulting engineering industry in terms of quality of designs, appropriate use of staff in design and implementation stages of projects.

In looking at impact it is clear from the survey that public sector respondents feel that there has been a decline in technical delivery and quality of design. The biggest impact however, they believe is the attention given to projects by senior staff – 7 of the 9 of respondents felt that there has been a significant decline in this aspect. The data also shows that less time is spent on projects by senior staff. This is a direct consequence of low tendered fees where projects can no longer afford expensive resources to spend time as was the case in the past. Work should rather now be carried out by lower paid and invariably lesser experienced staff. The re-use of standard solutions has also increased. This is confirmed by 8 of the 9 consultants who indicate that this practice is happening more. Again, this makes sense in view

of the pressure on fees and the availability of time for staff to spend on projects. Value engineering and testing of alternatives become less as it becomes much easier to use a previous design and modify it to suit the project specific requirements. Similar trends are observed from the public-sector responses where value engineering and testing of alternatives has also become worse.

From the international literature, the preferred method of procuring consulting services is the QBS method. The World Bank and the USA use QBS as their preferred method of selection and in Canada it is strongly proposed for public sector projects. Price is part of the evaluation and appointment process but only after qualifications and skills have been evaluated.

There is a need for the reintroduction of qualifications and experience in the selection process in South Africa. Following the review of SCM by National Treasury, the Standard for Infrastructure Procurement and Delivery Management was published. The SIPDM recommends that quality criteria be reintroduced into the evaluation and selection process for the appointment of consultants.

Objective 3: Establish the dominance of price in the evaluation of bids and the effect this has had on the consulting engineering industry.

The overall results from the survey indicate a consistent theme – competition based on price, despite being the current model, is not the preferred model for procuring consulting services. Public sector respondents (51%) indicted that price based competitive tendering is their primary mechanism for procuring consulting services. Consultants indicated that almost 60% of their work is procured on a competitive tendering basis. This however does not account for size of firm or scale of projects. Consultants on average offer discounts of greater than 40% on ECSA fee scales and more than 80% of respondents offer discounts in excess of 20%. Public sector clients believe that selecting a consultant based on qualifications and experience is the best method of selection with 96% of respondents indicating this. They do however believe that price should form part of the evaluation but should have a lesser weighting. The dominance of price in the appointment process and the excessive discounts offered by consultants has limited their ability to grow their business, attract and retain high quality staff and limited the quality of services provided to clients.

Research Aim: To better understand what the impact of the current public sector procurement system has been on the consulting engineering industry and what effect this has had on the long-term sustainability of the consulting engineering profession and the quality of services they provide to clients.

The research has given a better understanding of the impact the procurement system has had on the industry. The impact has been negative as is seen from the discussion above. Firms have not been able to grow, less effort is spent on mentoring and training and less effort is spent on innovation in design.

The Research Question: *"What is the impact of the current public sector procurement system on the consulting engineering industry."*

The current procurement system for professional engineering consultancy services has been detrimental to the industry and compromises the overriding Constitutional principles of sustainable provision of services, the promotion of efficient, economic, and effective use of resources and the cost-effective procurement for professional engineering consultancy

services. This is detrimental to both the industry and the country in the longer term. This will negatively impact government's efforts to provide infrastructure at the scale that it is required in the country.

The Research Assumption: The current public sector procurement system has had a negative impact on the consulting engineering industry.

The Research Proposition: The results of the study show that the current public sector procurement system has had a negative impact on the consulting engineering industry. This is with respect to services offered, mentoring and training, expansion of services and survival of consultants. Price has also been highlighted as a dominant factor in the appointment of consultants.

6. Recommendations

Despite the acknowledgement by the National Treasury that construction procurement is different to normal procurement and the efforts currently being undertaken to change this, engineering consultancy services remains commoditised. Clarity should be sought via the courts (declaratory order) on the sections of the Constitution relating to procurement and that have a bearing on the engineering consulting industry and the built environment. This initiative could be driven by Consulting Engineers South Africa (CESA) in collaboration with other built environment voluntary associations.

The following sections of the Constitution are relevant:

1. Paragraph 152: (1) *"The objects of local government are – (b) to ensure the provision of services in a sustainable manner;"* and (2) *"A municipality must strive, within its financial and administrative capacity, to achieve the objects set out in subsection (1)."*

   Clarity should be sought on the intention of the words: *"to ensure the provision of services in a sustainable manner."*

   The clause can generally be interpreted to mean that local government should provide services in a manner which does not compromise the ability of future governments to provide these services. In addition, the provision of these services through external parties engaged by local government should also be done in a sustainable manner i.e. the provision of services by external parties should be done in a way so as not to jeopardise the ability of these parties to provide these services in the future. Local government should therefore actively ensure the long-term sustainability of the provision of services.

2. Paragraph 195: (1) *"Public administration must be governed by the democratic values and principles enshrined in the Constitution, including the following principles: (b) the efficient, economic and effective use of resources must be promoted."*

   Clarity should be sought on the words and context of: *"efficient, economic and effective."*

   This could be interpreted as meaning the cheapest or lowest price.

   Clarity should be sought on what is meant by: *"resources."*

   This should include external parties engaged by government to provide services.

3. Paragraph 217: *"Procurement – (1) When an organ of state in the national, provincial or local sphere of government, or any other institution identified in national legislation, contracts for goods or services, it must do so in accordance with a system which is fair, equitable, transparent, competitive and cost effective."*

   Clarity should be sought on what is meant by *"competitive"*, with specific reference to the provision of professional engineering consultancy services.

   Competitive currently only means competition based on price. It should rather include a set of functionality criteria based on knowledge and experience to undertake the

work, quality of the bid submission and bidders' interpretation and understanding of the task at hand.

Clarity should be sought on what is meant by *"cost effective."*

Similarly, as for Paragraph 195: (1) in 2 above cost effective should not mean the cheapest or lowest price but rather best value for money which includes entire lifecycle costs.

Once a declaratory order is given by the court, the National Treasury and the National Department of Trade and Industry should be engaged to get the relevant legislation and regulations amended to bring the evaluation of quality back into the process of appointing consultants thereby reintroducing a quality and cost based selection process.

Engineering projects can generally be classified as follows:

- Routine or normal projects
- Complex projects requiring innovation using untried ideas and more than usual risk
- Mega or multi-disciplinary projects having large social, economic and environmental knock-on effects
- Feasibility and viability studies which may act as decision gates or fundamentally influence the concept design.

The results from Section 4.5.2 are put forward for consideration as a possible evaluation system for various categories of projects.

The following evaluation system is proposed:

Table 15 Proposed Evaluation Framework

	Proposed Weighting			
Project Complexity	Price	Experience & expertise	BBBEE	Other
Routine engineering services	35%	40%	15%	10% for localisation
Complex projects (specialised skill)	25%	65%	10%	N/A
Mega projects (including multi-disciplinary)	20%	60%	20%	N/A
Feasibility & viability studies	20%	70%	10%	N/A

For an initiative of this nature to be successful it needs to have buy in and support from all stakeholders in the industry. This should include the CBE, CIDB, ECSA, NERSA and the

NHBRC in the process so as not to duplicate any efforts they may be involved with in their engagements with Government. Other built environment professionals and voluntary associations should also be consulted such as those for architects, quantity surveyors and town planners.

The current on-going engagement and discussion at various levels between the consulting engineering industry and government should however continue to assist in finding lasting solutions for the benefit of the entire industry.

The following are areas that have been identified as possible future areas of research that will enhance the procurement of consulting engineering services and ultimately infrastructure delivery:

- A broader study of the perceptions of consultants and clients of procurement within the built environment. This study unfortunately did not reach a wide spectrum of role players. The study could be a national study that includes National Government Departments, state owned companies such as ACSA, PRASA and Transnet and provincial and local governments. The study could also cover built environment disciplines such as architecture, project management, quantity surveying and town planning
- A national study on the growth and decline of built environment firms since the introduction of competitive fee tendering in South Africa.
- An update on the study by Alison Lawless. This study was published in 2007 and it would be interesting to see how the capacity of the engineering industry has changed over the past ten years. This would be relevant to governments plans to invest in infrastructure.

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Annexure A
Public Sector Questionnaire

ASSESMENT OF PROFESSIONAL SERVICES BY CIVIL ENGINEERING CONSULTANTS

Completed by :

Date Completed :

Position :

Qualification and / or Registration:

Organisation :

Please select a consultant you have recently appointed and complete the assessment form below. You do not need to identify the consultant.

1. Which of the following municipal services fall within your responsibility?

Roads & Stormwater	
Water and/or Sanitation	
Engineering Structures	
Building Structures	
Electrical Engineering	
Mechanical Engineering	
Other	

2. Which method of procurement of consulting engineering services do you currently use? (Please indicate % based on number of contracts)

Price-based competitive bidding	
Selection based on qualification, experience & expertise	
Project appointment	
Roster	
Negotiation	
Other	
Total	100

3. Of which procurement method do you have experience?

Price-based competitive bidding	
Selection based on qualification, experience & expertise	
Project appointment	
Roster	
Negotiation	
Other	

4. Which procurement method would provide best long term value for money on projects for the Municipality (please rank)?

Price-based competitive bidding	
Selection based on qualification, experience & expertise	
Project appointment	
Roster	
Negotiation	
Other	

5. To what extent have the following contributions by consulting engineers changed on projects during the past ten years for which you have personal knowledge / responsibility?

	Much worse	A little worse	More or less the same	Better	Much better
Technical delivery i.e. meeting the project objectives					
Quality of design					
Quality of documentation					
Innovation and new products					
Testing of alternatives					
Value engineering incl optimisation					
Re-use of standard documents					
Attention by senior/experienced staff					
Transfer of know-how & sharing of ideas					
Value for money (fees)					

6. In the procurement of consulting engineering services, how should the emphasis be placed (over & above any preferring criteria such as B-BBEEE)?
(Please allocate % horizontally)

	Price i.e. fees	Expertise	Experience	Capacity	Other	
Routine, detail design						100
"Normal" projects using mainly only one discipline						100
Complex projects, requiring innovation using untried ideas & more than usual risks						100
Mega projects, multi disciplinary, with large economic, social & environmental knock-on effects						100
Feasibility & viability studies which may act as Go/No-go gates or fundamentally influence the concept design						100

Annexure B
Private Sector Questionnaire

ASSESMENT OF PROFESSIONAL SERVICES BY CIVIL ENGINEERING CONSULTANTS

Completed by :

Date Completed :

Position :

Organisation :

Please note that the information provided will be treated confidentially. Completing the above information is optional.

1. Approximate size of your firm (no of staff in South Africa)

1 - 20	
21 – 50	
51 – 100	
101 – 250	
250 – 1000	
> 1000	

2. Disciplines covered by your response / under your responsibility (% split)

Civil:	Roads	
	Water & Sanitation	
	Civil Engineering Structures	
	Building Structures	
Electrical / Electronic		
Mechanical		
Other		
	Total	100

3. Client bases in South Africa: Indicate approximate % split under your responsibility

Private Sector		
Public Sector:	Municipal	
	Provincial Government	
	National Government	
Public Entities	Transnet	
	Eskom	
	SANRAL	
	Other	
	Total	100

4. How is your work procured in South Africa? Please show % split by fee value.

Priced based competitive tendering	
Direct appointment	
Negotiation	
Roster	
Other	
Total	100

5. By how much did your expenditure on training, as a % of turnover, change over the past five years? (Average over the period)

Reduced by more than 10%	
Reduced by 5 – 10%	
More or less the same i.e. ± 5%	
Increase by 5 – 10%	
Increase by more than 10%	

6. On average, how much lower than the ECSA fee scales were the successful bids where price based competitive bidding is the norm i.e. what are the perceived discounts compared to ECSA fee scales?

	< 20%	20 – 40%	> 40%
Roads			
Water & Sanitation			
Civil Engineering Structures			
Building Structures			
Electrical			
Mechanical			

7. How has the pressure on fees, due to price-based competitive bidding impacted on your ability to deliver on projects; i.e. your staff composition and resourcing

	Much less	A little less	More or less the same	More	Much more
Time spent by senior experienced staff at concept development					
Opportunities for junior staff to spend time learning on the project					
Testing of alternatives					
Time for research and innovation; new product development					
Value engineering incl optimisation of design for construction; operation and maintenance					
Re-use of “standard” solutions					
Client capacity development					

8. Given the pressure on time and resources brought about by price-based competitive bidding, how much value do you anticipate to be added, if fees were to be increased by 10 - 20%

	0 or negative	0 – 5%	5 – 10%	> 10%
Reduction in capital costs due to improved designs, contract documentation & supervision				
Reduction in project life cycle costs due to improved designs, contract documentation & supervision				
Improvement in sustainability of projects (reduced energy consumption, less maintenance, longer useful life)				
Improvement in job opportunities during construction i.e. more labour intensive construction				

9. What percentage of staff aged < 35 years old has your firm lost in the last 5 years?

0	0 – 5%	5 – 10%	> 10%

10. How would you rank the possible reasons why young, qualified professionals typically < 35 years old, leave the consulting engineering profession.

	Please rank
Work is boring	
Not financially rewarding	
Risks are too great	
Better opportunities in other sectors	
Industry too cyclical	
Other (please state)	

Annexure C
Ethics Declaration

EBE Faculty: Assessment of Ethics in Research Projects

Any person planning to undertake research in the Faculty of Engineering and the Built Environment at the University of Cape Town is required to complete this form before collecting or analysing data. When completed it should be submitted to the supervisor (where applicable) and from there to the Head of Department. If any of the questions below have been answered YES, and the applicant is NOT a fourth year student, the Head should forward this form for approval by the Faculty EIR committee: submit to Ms Zulpha Geyer (Zulpha.Geyer@uct.ac.za; Chem Eng Building, Ph 021 650 4791). Students must include a copy of the completed form with the thesis when it is submitted for examination.

Name of Principal Researcher/Student: MF Moos Department: Civil Engineering

If a Student: Degree: MPhil Urban Infrastructure Design & Management
Supervisor: Professor Romano del Mistro

If a Research Contract indicate source of funding/sponsorship: N/A

Research Project Title: THE IMPACT OF THE CURRENT PROCUREMENT SYSTEM ON THE CONSULTING ENGINEERING INDUSTRY

Overview of ethics issues in your research project:

Question 1: Is there a possibility that your research could cause harm to a third party (i.e. a person not involved in your project)?	YES	NO x
Question 2: Is your research making use of human subjects as sources of data? If your answer is YES, please complete Addendum 2.	YES	NO x
Question 3: Does your research involve the participation of or provision of services to communities? If your answer is YES, please complete Addendum 3.	YES	NO x
Question 4: If your research is sponsored, is there any potential for conflicts of interest? If your answer is YES, please complete Addendum 4.	YES	NO x

If you have answered YES to any of the above questions, please append a copy of your research proposal, as well as any interview schedules or questionnaires (Addendum 1) and please complete further addenda as appropriate.

I hereby undertake to carry out my research in such a way that

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

Signed by:

	Full name and signature	Date
Principal Researcher/Student:	MF Moos	22 May 2013

This application is approved by:

Supervisor (if applicable):		23 May 2013
HOD (or delegated nominee): Final authority for all assessments with NO to all questions and for all undergraduate research.		27/5/13
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.		

ADDENDUM 1:
Please append a copy of the research proposal here, as well as any interview schedules or questionnaires:

See attached

Signed

ADDENDUM 2: To be completed if you answered YES to Question 2:

It is assumed that you have read the UCT Code for Research involving Human Subjects (available at http://web.uct.ac.za/depts/educate/download/uctcodeforresearchinvolvinghumansubjects.pdf) in order to be able to answer the questions in this addendum.

2.1 Does the research discriminate against participation by individuals, or differentiate between participants, on the grounds of gender, race or ethnic group, age range, religion, income, handicap, illness or any similar classification?	YES	NO
2.2 Does the research require the participation of socially or physically vulnerable people (children, aged, disabled, etc) or legally restricted groups?	YES	NO
2.3 Will you not be able to secure the informed consent of all participants in the research? (In the case of children, will you not be able to obtain the consent of their guardians or parents?)	YES	NO
2.4 Will any confidential data be collected or will identifiable records of individuals be kept?	YES	NO
2.5 In reporting on this research is there any possibility that you will not be able to keep the identities of the individuals involved anonymous?	YES	NO
2.6 Are there any foreseeable risks of physical, psychological or social harm to participants that might occur in the course of the research?	YES	NO
2.7 Does the research include making payments or giving gifts to any participants?	YES	NO

If you have answered YES to any of these questions, please describe below how you plan to address these issues:

N/A

Signed

ADDENDUM 4: To be completed if you answered YES to Question 4

4.1 Is there any existing or potential conflict of interest between a research sponsor, academic supervisor, other researchers or participants?	YES	NO
4.2 Will information that reveals the identity of participants be supplied to a research sponsor, other than with the permission of the individuals?	YES	NO
4.3 Does the proposed research potentially conflict with the research of any other individual or group within the University?	YES	NO

If you have answered YES to any of these questions, please describe below how you plan to address these issues:

N/A

Signed